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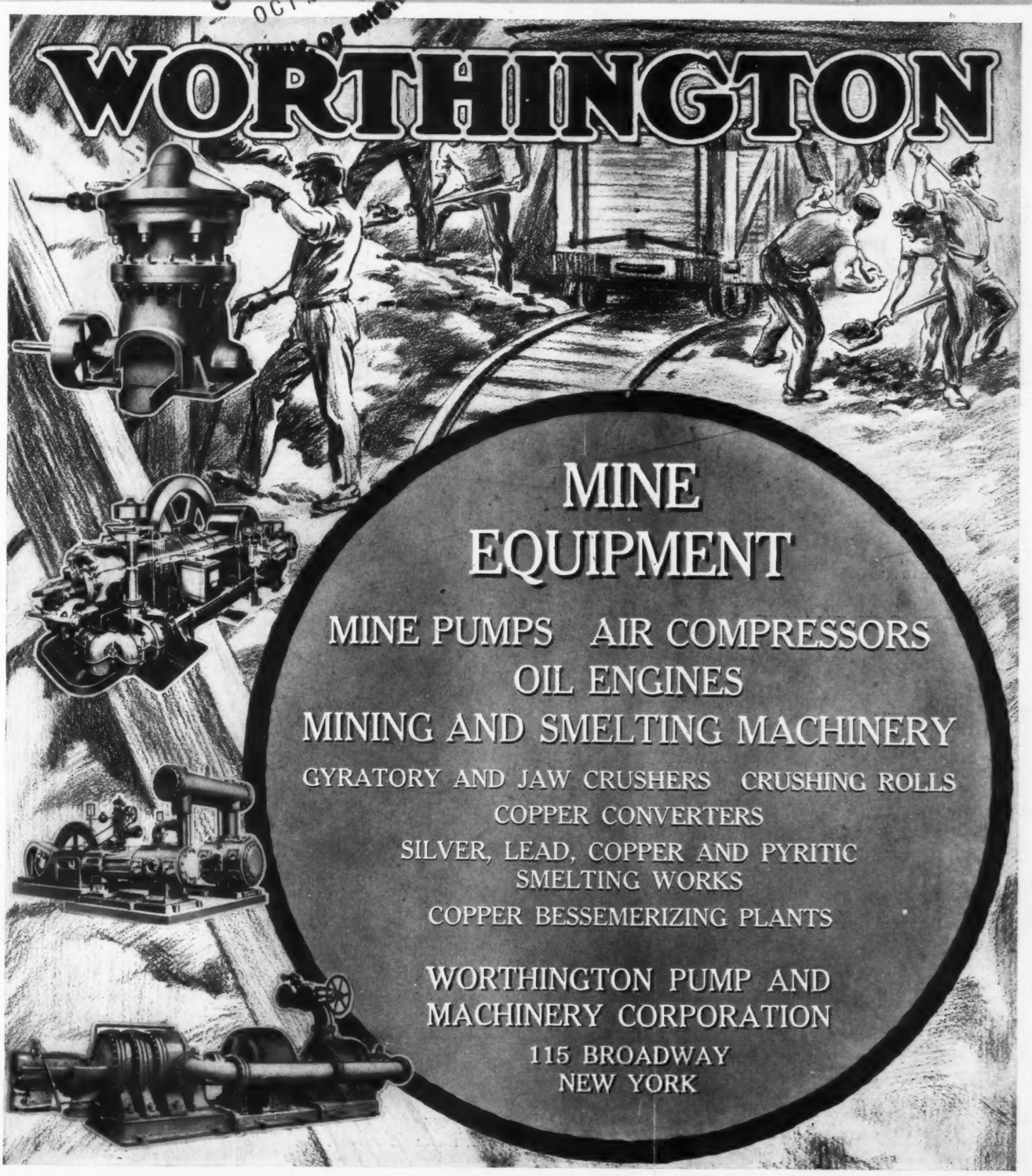

"S-A" BELT CONVEYORS

on the

Panama Canal

These two views show a pair of 36-inch by 122-ft. "S-A" Steel Pan Conveyors furnished to the Isthmian Canal Commission for the Porto Bello Crushing Plant on the Panama Canal. These conveyors work in conjunction with a pair of "S-A" Pivoted Bucket Carriers, which distribute to the storage bins.

Rock from this immense plant was loaded to barges and towed to the canal for concrete work.

The upper picture shows a front view of conveyors from crusher house to storage bins and the lower cut a side view of the same conveyors. All rope drives and clutches in this plant were built with the conveyors.

Write for details and further information regarding the use of "S-A" equipment on any kind of construction or excavating work.

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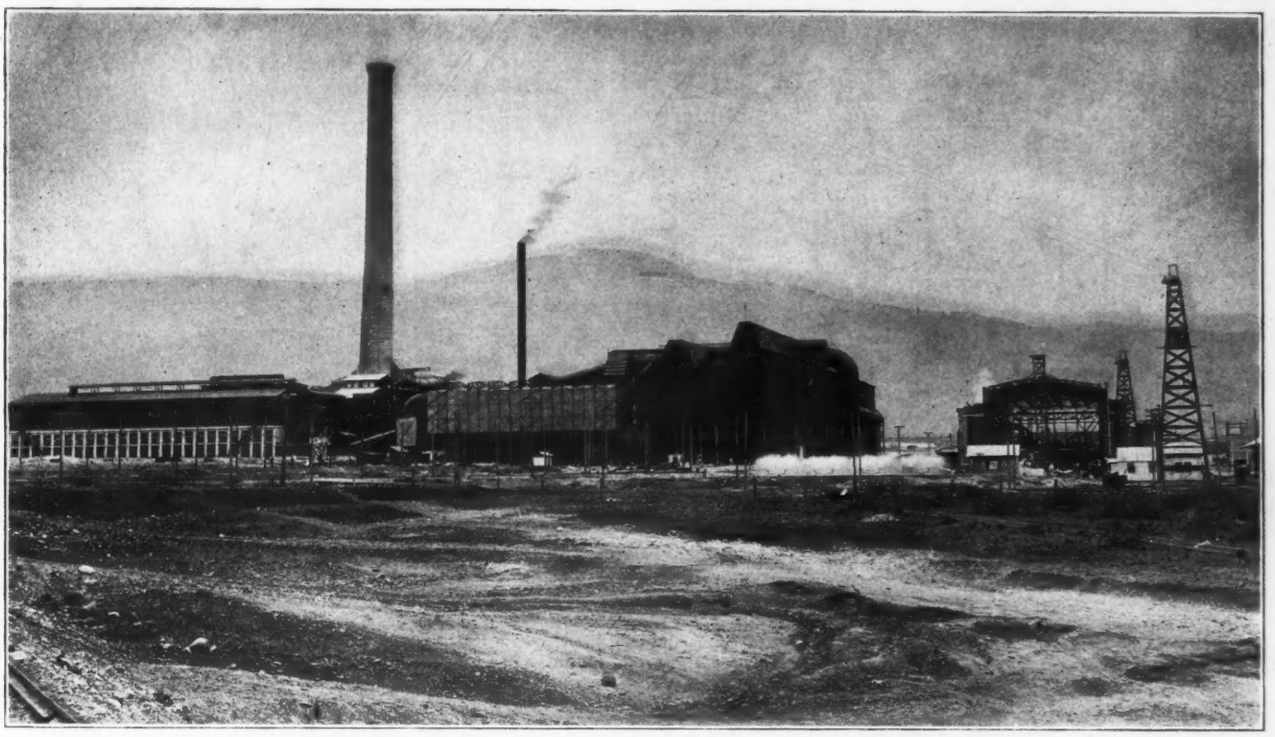


GENERAL VIEW OF UNITED VERDE EXTENSION PLANT

The United Verde Extension Mining Company's Smeltery and Converter Plant

BY F. E. NICHOLS*

A description of a notable Arizona plant of modern design and recent construction. The blast-furnace has a capacity of 600 tons per day, and the plant includes reverberatory furnaces, roasting furnaces, and converters. Pulverized coal was introduced into Arizona at this installation. Converter and blast-furnace gases are discharged into dust chambers, and provision is made so that the Cottrell process can be installed later if a material increase in plant capacity is desirable.

THE starting of the new smeltery of the United Verde Extension Mining Co. supplies further proof, if such were needed, of Arizona's undoubted copper supremacy. The new plant is not at present one of the largest copper smelteries, but, in carrying out the design, careful provision has been made to permit future extension.

The major units of the plant comprise one 48 in. x 26 ft. 8-in. blast furnace; two 25 ft. x 120 ft. reverberatory furnaces; six 21 ft. 6-in. six-hearth Wedge roasting furnaces, and three 12-ft. converters of the Great Falls type. Around these units have been grouped various items of structural, mechanical and electrical equipment designed to produce high efficiency in handling the materials to be treated. The smeltery is in the Verde Valley about 3½ miles from Clarkdale, Ariz., and a town site has been laid out near by to accommodate the employees.

The ore from the mine is dumped into receiving bins of 1500 tons' total capacity. These are of bunker type and constructed of steel. A 30-in belt conveyor takes

*With A. G. McGregor, constructing engineer, Warren, Arizona.

the ore to the crushing and sampling plant, a flow sheet of which is shown in Fig. 1. It will be noted that a secondary unit is installed to sample the fines separately. After sampling, a 24-in. belt conveyor takes the coarse material to the coarse bedding bin, and a 20-in. belt conveyor carries the fine material to the fines bedding the blast-furnace building. A 24-in. conveyor on each side of the furnace receives the ore and drops it into bins, from which it is drawn into charge cars. The gates under the blast-furnace bins are operated pneumatically. A charge car, similar to the cars used by the Calumet & Arizona Mining Co., at Douglas, Ariz.,

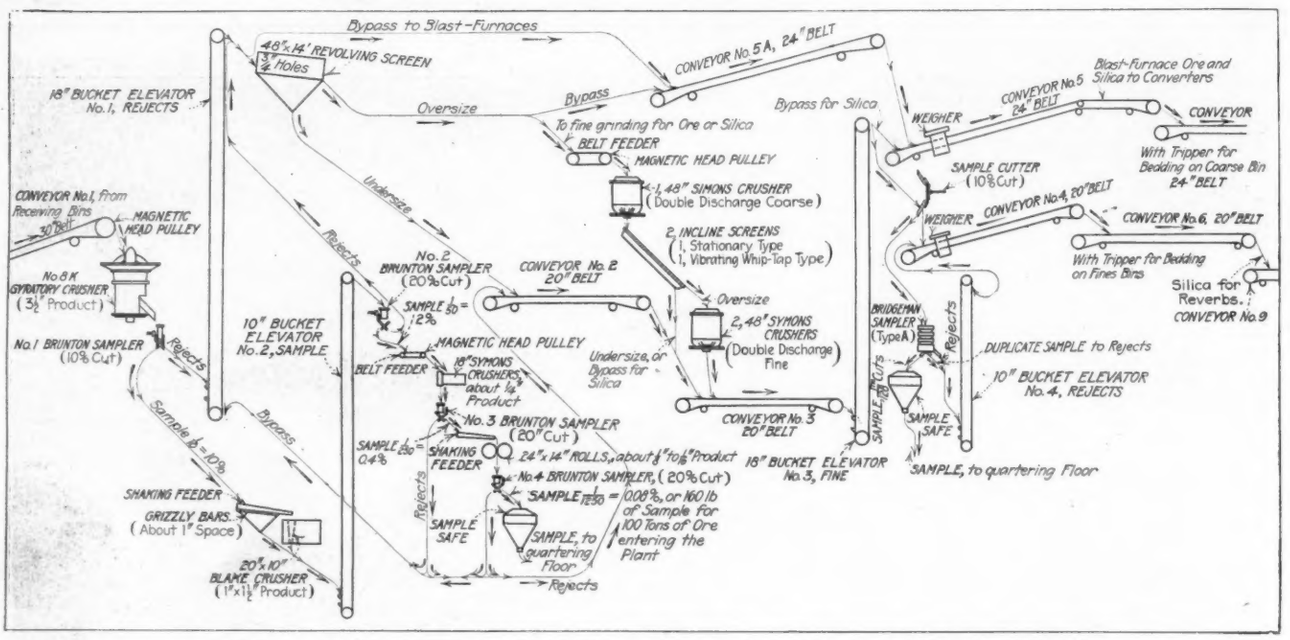

Bypass to Blast-Furnaces
48"x14' REVOLVING SCREEN
3" Holes
18" BUCKET ELEVATOR No. 1, REJECTS
Oversize
Bypass
CONVEYOR No. 5A, 24" BELT
Bypass for Silica
To fine grinding for Ore or Silica
BELT FEEDER
MAGNETIC HEAD PULLEY
1, 48" SIMONS CRUSHER (Double Discharge Coarse)
2, INCLINE SCREENS (1, Stationary Type 1, Vibrating Whip-Tap Type)
Undersize
Rejects
CONVEYOR No. 1, from Receiving Bins 30" Belt
MAGNETIC HEAD PULLEY
No. 8 K GYRATORY CRUSHER (3½" Product)
No. 2 BRUNTON SAMPLER (20% Cut)
CONVEYOR No. 2 20" BELT
SAMPLE 1/20 = 12%
10" BUCKET ELEVATOR No. 2, SAMPLE
MAGNETIC HEAD PULLEY
No. 1 BRUNTON SAMPLER (10% Cut)
BELT FEEDER
18" SYMONS CRUSHERS, about 1/4" Product
Undersize, or Bypass for Silica
Oversize
2, 48" SYMONS CRUSHERS (Double Discharge Fine)
No. 3 BRUNTON SAMPLER (20" Cut)
SAMPLE 1/20 = 0.4%
SHAKING FEEDER
24"x14" ROLLS, about 1/8" to 1/16" Product
CONVEYOR No. 3 20" BELT
18" BUCKET ELEVATOR No. 3, FINE
No. 4 BRUNTON SAMPLER, (20% Cut)
SAMPLE 1/250 = 0.08%, or 160 lb of Sample for 100 Tons of Ore entering the Plant
SAMPLE SAFE
SAMPLE, to quartering Floor
Rejects
Sample 8 = 10%
Bypass
SHAKING FEEDER
GRIZZLY BARS (About 1" Space)
20"x10" BLAKE CRUSHER (1"x1½" Product)
WEIGHER
CONVEYOR No. 5 24" BELT
Blast-Furnace Ore and Silica to Converters
CONVEYOR
With Tripper for Bedding on Coarse Bin 24" BELT
SAMPLE CUTTER (10% Cut)
CONVEYOR No. 4, 20" BELT
WEIGHER
CONVEYOR No. 6, 20" BELT
With Tripper for Bedding on Fines Bins
Silica for Reverbs. CONVEYOR No. 9
BRIDGEMAN SAMPLER (Type A)
Rejects
DUPLICATE SAMPLE to Rejects
10" BUCKET ELEVATOR No. 4, REJECTS
SAMPLE SAFE
SAMPLE, to quartering Floor

FIG. 1. FLOW SHEET OF CRUSHING, CONVEYING, AND SAMPLING OPERATIONS

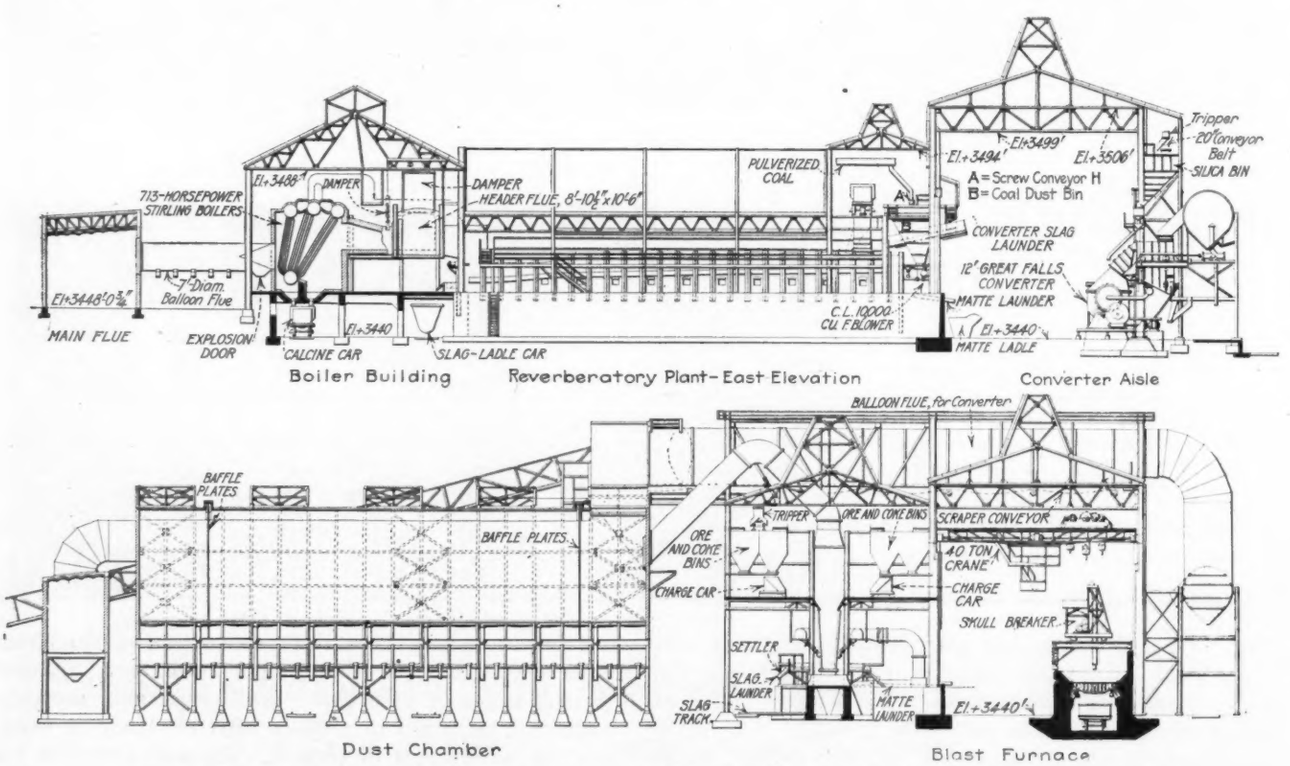


FIG. 2. SECTION THROUGH SMELTERY OF UNITED VERDE EXTENSION MINING COMPANY

bin. These bins are of reinforced concrete construction. The capacity of the fines bin is 5000 tons, and that of the coarse bin 5300 tons, the latter figure including space for about 850 tons of silica. A 30-in inclined conveyor take the coarse ore from the bedding bin into serves each side of the furnace. The bottoms of these cars are at an angle of 45°, thus allowing the material to slide into the furnace by lifting the door of the car. The cars rest upon track scales while receiving their charge of ore or coke. Coke bins are placed adjacent

to the ore bins, and the coke is brought to them by the same conveyor system used for the ore.

The blast furnace is 48 in. x 26 ft. 8 in., and its normal capacity is 600 tons per day. The molten product is tapped into one of two settlers at each end of the furnace. The slag is handled by electrically tilted cars of 225 cu.ft. capacity, drawn by 24-ton electric locomotives. A 24-in. belt conveyor takes the fines to the roasting plant from the bedding bins. After being calcined, electric calcine cars of 15 tons' capacity take them to the reverberatories. These cars, similar to those used by the International Smelting Co., at Miami, Ariz., are fitted with a special intake sleeve, hand

of a 24-in. Jeffrey single-roll crusher, a Fuller-Lehigh indirect-fired rotating drier, and a battery of four 42-in. Fuller-Lehigh ball pulverizing mills. From the coal crusher to the reverberatories the coal is conveyed by spiral-screw conveyors, the first three being 16 in. and the rest 14 in. Three bucket elevators are also used.

In the converter plant, a 40-ton electric traveling crane, with two auxiliary hoists, serves the converters and the copper-casting machine. The cross-sectional drawing (Fig. 2) shows the overhead silica bins, with their convenient spouts. A straight-line copper-casting machine will be a feature of the equipment. The McGregor skullbreaker that has been installed is about

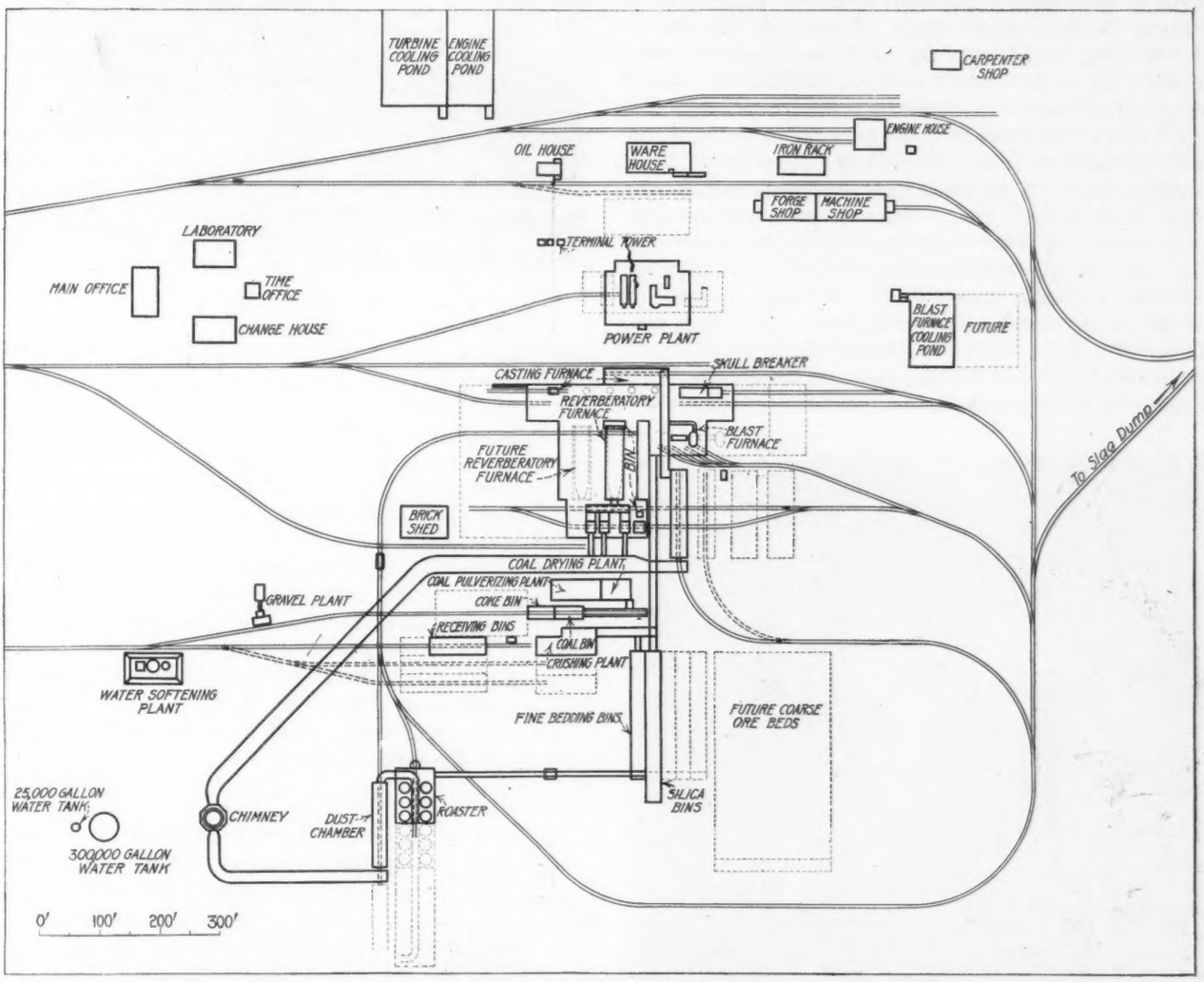


FIG. 3. GENERAL LAYOUT OF PLANT AND AUXILIARY EQUIPMENT.

operated, insuring a dust-tight connection with the spout from the roaster calcine bin. A similar mechanism is fitted to the charge hoppers serving the reverberatory furnaces, so that the fine calcines are transferred from roasters to reverberatories without loss.

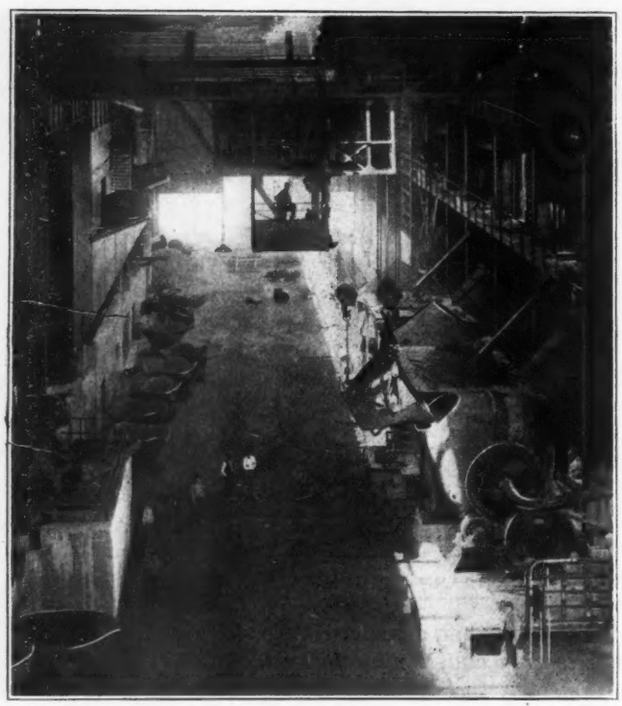
Each reverberatory furnace has a nominal capacity of 500 to 600 tons per day. The slag is handled in the same manner as the blast-furnace slag. The reverberatories are similar to the International Smelting Co.'s furnaces, except that they are coal-dust fired, thus introducing this method of firing into Arizona, where fuel oil has of late years been used exclusively. The coal-crushing and -pulverizing equipment consists

the same as that described on p. 762, Vol. 97, of the *Engineering and Mining Journal*.

The converter and blast-furnace gases are discharged into a dust chamber, 1400 sq.ft. in section and 144 ft. long, elevated above the ground to permit the accumulated dust to be drawn directly into cars. From here the gases enter the main flue (brick), which is 16 ft. x 20 ft. at that point. The flue enlarges to 25 ft. x 20 ft., and is joined by the flues from the waste-heat boilers and reverberatory furnaces. The total length of the main flue is 976 ft. 6 in. The roaster gases are treated in a separate dust chamber, 1000 sq.ft. in section and 144 ft. long, and then discharge through a

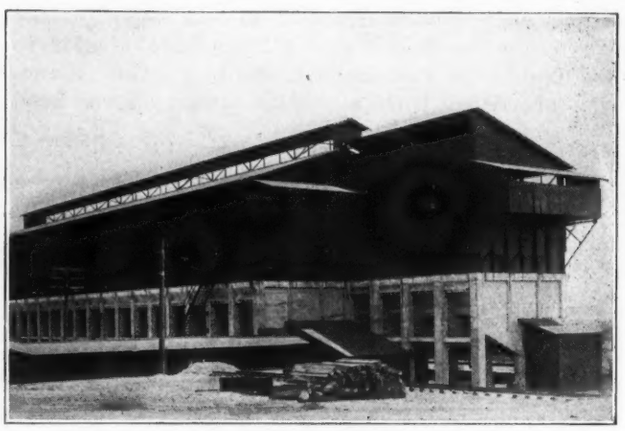
16 ft. x 16-ft. brick flue 360 ft. long, leading to the stack. The latter is of brick construction, 425 ft. high and 30 ft. inside diameter at the top, and stands on a hill behind the plant which is 110 ft. higher than the main building floor. No Cottrell dust-collecting systems have been employed in the initial installation, for the reason that it was thought best to equip the plant with large flues to permit ample future extension should it become desirable. For the present smelting capacity, the large flues provide ample dust-settling facilities. The plant is laid out so that when it becomes expedient materially to increase its capacity Cottrell dust-collecting systems can be readily installed.

As is now usual, the reverberatory waste heat is utilized in generating steam. Three Stirling waste-heat boilers, of 713 rated hp. each, have been installed. In addition to these there are two Stirling direct-fired boilers of 439 rated hp. These are fired with pulverized coal. The steam from the boilers is taken to the power plant through a 10-in. steam loop. The power plant building, which is of brick and steel construction and 104 ft. x 234 ft. in plan, contains the following main units: Two 2200-volt turbo generators for power for the mine and smeltery—one of 1000 kw., the other of 1500 kw. capacity; two 200 kw. motor-generator sets for direct current for the plant; two units, each consisting of a Roots 400 cu.ft. blower, direct connected to a tandem compound Allis-Chalmers engine, for the blast-furnace air; and two Allis-Chalmers 18,000 cu.ft. blowing engines for the converter air. Surface condensers with Volz heaters are used throughout. The engine spray cooling pond, 78 ft. x 160 ft., is separate from the turbine cooling pond, which is 110 ft. x 160 ft. Water is obtained on the site from wells at a depth of 100 ft. and is pumped into a 300,000-gal. concrete tank on the hill above the works. That used for power plant and cooling ponds is treated to reduce hardness.



CONVERTER AISLE

The plant has a brick and steel shop building, at one end of which are erected the machine shop tools, which consist of a 30-in. x 24-ft. lathe, 14-in. x 8-ft. lathe, 24-in. Aurora drill press, 6-ft. radial drill press, 30-in. open-side planer, 20-in. back-geared shaper, 58-in. 150-ton wheel press, a large and a small pipe machine, and a bolt cutter. The plate shop at the other end of the building contains a slip-roll former, a 30-in. punch and shear, and a 1100-lb. steam hammer. The carpenter's shop is in a separate building and is equipped with wood-working machinery. There is also a warehouse 50 ft. x 112 ft. in dimension. A separate structure contains the lubricating-oil tanks. The locomotive shed has two pits and is 50 ft. x 50 ft. A shed for storing brick has been built near the reverberatory plant. The administration buildings are of brick construction and comprise a general office, 44 ft. x 80 ft.; a laboratory, 44 ft. x 70 ft.; a change house, 44 ft. x 70 ft.; and a check or time-card office, 24 by 24 feet.



BEDDING BINS

A. G. McGregor and his staff, of Warren, Ariz., designed the plant. T. A. Stiles was superintendent of construction, assisted by R. W. Kerns. Barry Hogarty is the smeltery superintendent, and George Kingdon is general manager for the company.

Crude Petroleum in 1917

The world's production of crude petroleum in 1917 is given in the following table, which has been prepared by J. D. Northrop, of the U. S. Geological Survey:

WORLD'S OUTPUT OF CRUDE PETROLEUM IN 1917

Country	Production: Barrels of 42 Gal.	Production: Metric Tons	Per Cent. of Total
United States	(a) 335,315,601	44,708,747	66.98
Russia	(b) 69,000,000	9,418,509	13.78
Mexico	55,292,770	8,264,266	11.04
Dutch East Indies	(c) 12,928,955	1,778,495	2.58
India	(b) 8,500,000	1,133,333	1.70
Galicia	5,965,447	(d) 829,629	1.19
Japan and Formosa	2,898,654	386,487	0.58
Rumania	2,681,870	(b) 373,000	0.54
Peru	2,533,417	337,789	0.51
Trinidad	1,599,455	222,456	0.32
Argentina	1,144,737	168,340	0.23
Egypt	1,008,750	134,500	0.20
Germany	995,764	(b) 140,000	0.20
Canada	205,332	27,378	0.04
Italy	50,334	(b) 7,000	0.11
Other countries	(b c) 530,000	70,667	
Total	500,651,086	68,000,596	100.00

(a) Quantity marketed. (b) Estimated. (c) Includes British Borneo. (d) Estimated in part. (e) Includes 19,167 bbl. produced in Cuba.

Remember the Comfort Fund of the 27th Engineers.

The Dangers of Paternalism in Government*

THE qualities, conduct and achievements of our Army are the just admiration of our comrades in arms, as they are the just pride of America. Wherever American troops have fought thus far, they have either held the line or advanced, but never gone back. Our young Army has been tested in many a battle, and wherever it has fought it has proved itself a worthy custodian of American honor and a zealous artisan of American glory.

Now, gentlemen, what is the underlying cause for the phenomenon that our boys, taken from the most diversified walks of life, brought up in surroundings and in a spirit which are the very negation of martial disposition, became in an incredibly short space of time soldiers of first-rate efficiency; that our business men, farmers, mechanics, college boys are making competent, indeed excellent, officers; that our West Pointers, taken from small Army posts or office positions in Washington, were found qualified generally not only to command large bodies of troops, but that among them were discovered men fitted, when the emergency arose, to plan and execute the business undertakings of war on a stupendous scale with a high degree of organizing and administrative ability (even though these men would be the last to dispute that a considerable share of the credit for the results accomplished is due to those who, at the very start of the war, eagerly volunteered from civil life)?

I have heard this debated a good many times lately both in England and France, and the consensus of replies is this: "You in America have always been a nation of private enterprise and individual initiative. You have had no caste, or fixed class, either aristocratic or bureaucratic. You have given almost unlimited, perhaps too unlimited, scope to ambition, ability, force, imagination, hard work. You had a healthy skepticism of governmental capacity to do things well.

"Under the stimulus of these conditions, you have produced a race—daring, keen, quick-witted, adaptable, self-reliant. The American of today, as we see him in the officers and men of your forces and in the business men we have met, is the product of generations of sturdy individualism."

The Frenchman would point out that France has had experience of bureaucracy, governmental centralization and paternalism for several generations. That system had lamed enterprise, atrophied commercial daring, retarded the development of the country.

In Russia, bureaucracy and paternalism, plus weak, corrupt and inefficient autocracy, had led to revolution, chaos and anarchy.

In Germany, bureaucracy and paternalism, plus militarism and junkerism, had resulted in bringing untold misery upon the world at large and inevitable disaster in the end to the German people.

In short, my French interlocutors would coincide that whenever, wherever and however the system of governmental omnipotence had been tried, it had failed in a greater or lesser degree; that France had given it a sufficiently long test to be weary of it, and that after the war the tendency of the French people would be to turn more toward individual effort and to stimulate personal initiative.

On the other hand, it cannot be gainsaid that there are a good many persons in France, as in Great Britain and America, who firmly believe that the era of individualism, or, as they prefer to call it, capitalism, has come to an end, and that an entirely new kind of social structure will be reared after the war. They are very active, zealous and eager, these militant preachers of a new day. They possess the fervor of the prophet allied often to the plausibility and cunning of the demagogue. They pour the vials of scorn and contempt upon those benighted ones who still tie their boat to the old moorings of the teachings of history and of common sense appraisal of human nature. And being vociferous and plausible, they are unquestionably making converts. They are offering the vista of a catching program to the popularity-seeking politician. They are perturbing the minds of a good many who honestly seek—as every right-minded man should—to bring about a better and more justly ordained world. They have not been without producing a certain effect even in high places.

Nothing is easier than to start, nothing moves faster when once started, than economic fallacies. Nothing is harder than for sober, unvarnished truth, loaded down with the weight of the realities of existence, to catch up with those fallacies. It invariably does in the end, but meanwhile the fallacies, on their long start and rapid flight, may have wrought vast harm, as we have recently seen exemplified in Russia. We hear a good deal nowadays of "the war after the war." That discussion, to an extent, it seems to me, is premature.

A Real "War" After the War

But there is one "war after the war" for which the lines are now being drawn, and which, indeed, the attacking party has already started, although it was the country's general understanding that, until the war against our external enemy is won, internal conflicts should be postponed: That is the war of the motley army—ranging from the American variety of destructive Bolsheviks in various gradations to self-seeking demagogues, well-meaning utopianists, intolerant and impetuous young writers strong in the assured consciousness of their mental and moral superiority, iconoclast theorists, and, alas! too often, overworked, underpaid and consequently somewhat acidified college professors and other teachers—against those who believe that the accumulated wisdom of centuries of human experience is wisdom still, and who see in individualism, ordered, enlightened, progressive, sympathetic and adjusted to the changing needs and social conceptions of the age, the soundest and most effective instrument for the advancement and the happiness of humanity.

When I speak of individualism, I do not mean the harsh doctrine of the so-called Manchester school of

*An address, very slightly condensed, delivered before the convention of the American Bankers' Association, at Chicago, Sept. 27, 1918, by Otto H. Kahn, of the firm of Kuhn, Loeb & Co., of New York.

the nineteenth century, which, with a somewhat naïve faith in the automatic and beneficent self-regulation of human forces, bade the individual to exploit his opportunities to the unrestrained limit of his strength, and the devil take the hindmost. The individualism to which I adhere spells neither reaction nor greed, selfishness, class feeling or callousness. No less than those who carry their hearts visibly aching for the people and aflame against their oppressors, into magazine articles, political assemblies and upon lecture platforms—no less than they are we desirous for the well-being and contentment of the masses of the people.

Incentive to Effort

The individualism we believe in gives incentive to every man to put forth his best effort, while at the same time it recognizes fully the right and the duty of the state to impose upon business reasonable supervision, restraints, and regulations; to take measures destined to raise the general level of popular well-being; to protect particularly those least able to protect themselves; to prevent exploitation and oppression of the weak by the strong, and to debar privilege and unfair or socially harmful practices. And we further believe that in addition to and over and above the limitations imposed by the state there are restraints which a man's conscience should impose upon his actions in affairs. It is not enough to be "law-honest" or "money-honest."

I am far from saying that material reward is the only incentive to business effort, but experience has shown and common sense observation confirms that, excepting such callings as men take up because of an "inner urge," from a natural bent or altruistic motives, or because they desire primarily position, public office, or political power, the vast majority of people require, in order to put forth the maximum of effort and of venturing, an incentive largely, though not solely, of a tangible kind. In an emergency, of course, at the call of the country, every right-thinking man will not only forget all thought of reward, but will be ready for every sacrifice. He will work and strive fully as hard as and far harder than he would for his personal advantage, and spend himself without limit, from motives of patriotism or public spirit.

Confiscation of Big Incomes Will Not Support the War

Individualism frankly denies that the world can be run on a theory which presupposes the existence of mental, moral and physical equality between men. Equality before the law, equality of political rights, —equality of opportunity, as far as humanly possible—yes. But an inscrutable Providence has bestowed upon His creatures, animate as well as inanimate, inequality of natural endowment, and from that springs and must necessarily spring inequality of results.

Do you realize that if all incomes above $100,000 were confiscated, as has been urged by some, the resulting sum would barely cover our war expenditures for one month? Do you know that if all incomes above even $10,000 were taken and distributed among those earning less than $10,000, the result, as far as I can figure out, would be that the aggregate income of those receiving that distribution would be increased barely 6 per cent.?

I have complete confidence in the sober common sense of the American people. I believe that when they have been placed in possession of adequate information, when the pros and cons of a proposition have been fully discussed before them and by them, they can always be relied upon to reach sound conclusions. The menace which I see is not in the deliberate will of the people, but in the fact that under the emotional stress of war, under the patriotic impulse of the time, under the actual or fancied necessity of the war situation, tendencies are tolerated and modes of thought and action permitted to gain a footing unopposed, which are apt to create very serious problems upon the return of normal conditions.

In what I am going to say I wish very distinctly and earnestly to disclaim any intention of criticizing our present Government. It would be most unbecoming and improper to do so before this non-partisan gathering, in which politics can have no place. What I mean to bring out is not any sins of omission or commission of the present Administration, but unavoidable frailties and shortcomings which are inherent in the very essence of all government and which emphasize the need, particularly in a democracy, of confining the business functions of government to activities which private enterprise cannot undertake equally as well as or better than the state, or which, in the interest of the maintenance of free institutions, private enterprise should not be permitted to undertake.

Liberty necessarily limits governmental efficiency. That is part of the price which we pay for freedom. We do not begrudge the price. We are prepared to pay any price for the supreme blessing of being free men—if necessary, even the price of our very lives, as many of those did who procured for us the great legacy of liberty. But why unnecessarily bid up the price against ourselves by extending the scope of governmental activities beyond the field which naturally belongs to them?

Government the Negation of Competition

Government, in its very essence, is the negation of competition. It is, by the very fact of its being, whatever its name or kind, the monopoly of monopolies. It cannot but be affected with those shortcomings which spring from the absence of competition and the exercise of monopoly. Why, then, should a people which rightly discountenances monopoly and rightly believes in the principles of competition, enlarge the operations of governmental agencies further than is required for the recognized purposes which a free government is meant to serve?

I do not fail to recognize that, certainly during the period of reconstruction, and probably more or less permanently, both here and in Europe, the scope of state activities is bound to increase and must concern itself with and intercede in matters which heretofore were left entirely to private enterprise. But this concern and intercession should be such as not to eliminate or lame private enterprise, but to make it more effective. Nor do I fail to recognize, but, on the contrary, I welcome unreservedly—as I am sure we all do—the prospect that in the times which will follow the profound

upheaval of the war, the standard by which men will be judged and rewarded will be, more strictly, exactingly and far-reachingly than heretofore, that of work done, duty performed, services rendered. The world will have no place for idlers and social slackers. Rank will reside not in birth or wealth—neither, I trust, will it reside in an office-holding caste—but in useful achievement.

From governmental paternalism to socialism is not a very long step. The menace, however, of bureaucratism and socialistic paternalism, with their insidious effect upon the very fiber and marrow of the race, confronts us now. While bureaucracy and efficiency can go together under an autocratic regime, it is impossible in the very nature of things for bureaucracy to go together with efficiency in a democracy. Nor, indeed, can paternalism and liberty exist side by side. Bureaucracy is either wasteful, stagnant and inefficient, or it is, as in Germany, ruthless in its methods, oppressive in its spirit and poisonous in its effect. It resents progress, vision and innovation because these are disturbing and antagonistic to the very essence of its being —routine.

In our own case the soil for the growth of the noxious weeds which spring from the seed of bureaucracy is particularly fertile, for a variety of reasons. Washington is heavy with the atmosphere of politics, and is pervaded, as no other capital I know, with the spirit and the very flavor of things governmental. Fatal to the attainment of governmental efficiency of a high order is the custom of changing officials with a change of administration.

The Railroads

Individual enterprise has given us what is admittedly the most efficient railroad system in the world. It has done so while making our average capitalization per mile of road less, the scale of wages higher, the average rates lower, the service and conveniences offered to the shipper and the traveler greater, than in any other of the principal countries. It is true that in the pioneer period of railroad development, and for some years thereafter, numerous things were done, and although generally known to be done, were tolerated by the Government and the public, which should never have been permitted. But during the second administration and upon the courageous initiative of President Roosevelt these evils and abuses were resolutely tackled, and a definite and effective stop was put to most of them. Means were provided by salutary legislation, fortified by decisions of the Supreme Court, for adequate supervision and regulation of railroads. The law enacted under President Roosevelt's administration was not allowed to stand for a sufficient length of time to test its effects. The enactment of new railroad legislation in 1909, established, for the first time in America, paternalistic control over the railroads.

Hampered, confined, harassed by multifarious, minute, narrow, and sometimes flatly contradictory regulations and restrictions, state and Federal, that great industry began to fall away. Initiative on the part of those in charge became chilled; the free flow of investment capital was halted; creative ability was stopped; growth was stifled; credit was crippled.

The theory of governmental regulation and supervision was entirely all right. No fair-minded man would quarrel with that. But the practical application of that theory was wholly at fault and in defiance of both economic law and common sense. It was bound to lead to a crisis. It is not the railroads that have broken down—it is our railroad legislation and commissions which have broken down. The Government, in the emergency of war, probably wisely, and, in view of the prevailing circumstances, necessarily, has assumed the operation of the railroads. The Director General of Railroads, rightly and courageously, proceeded to do immediately that which the railroads for years had again and again asked in vain to be permitted to do—only more so. Freight rates were raised 25%, passenger rates 50%, many wasteful and needless practices heretofore compulsorily imposed were done away with. The whole theory under which intelligent, effective and systematic coöperation between the different railways had formerly been made impossible was thrown into the scrap heap.

The question of the disposition to be made of the railroads after the war is one of the most important and far-reaching of the post-bellum problems which will confront us. My concern is not for the stock and bond holders. They will, I have no doubt, be properly and fairly taken care of in case the Government were definitely to acquire the railroads. Nor do I speak as one who believes that the railroad situation can be restored just as it was before the war. The function, responsibility and obligation of the railroads as a whole are primarily to serve the interests and economic requirements of the nation. The disjointed operation of the railroads, each one considering merely its own system (and being under the law practically prevented from doing otherwise), will, I am sure, not be permitted again.

The American System

The relinquishment of certain features of our existing legislation, the addition of others, a more clearly defined and purposeful relationship of the nation to the railroads, involving among other things possibly some financial interest of the Government in the results of railroad operations, are certain to come from our experiences under Government operation and from a fresh study of the subject, in case the railroads, as I hope, are returned to private management. Personally I believe that in its underlying principle, the system gradually evolved in America, but never as yet given a fair chance for adequate translation into practical execution, is an almost ideal one. It preserves for the country, in the conduct of its railroads, the inestimable advantage of private initiative, efficiency, resourcefulness and financial responsibility, while at the same time, through governmental regulations and supervision, it emphasizes the semi-public character and duties of railroads, protects the community's rights and just claims, and guards against those evils and excesses of unrestrained individualism which experience has indicated.

It is, I am profoundly convinced, a far better system than government ownership of railroads, which, wherever tested, has proved its inferiority, except, to an extent, in the Germany on which the Prussian Junker planted his heel and of which he made a scourge and a horrible example to the world; and the very reasons which have made state railways measurably successful

in that Germany are the reasons which would make Government ownership and operation in America a menace to our free institutions, a detriment to our racial characteristics and a grave economic disservice.

I have spoken of the treatment of our railroads in the past 10 years as "punitive paternalism." In some respects this same term may be applied to our existing and proposed war taxation. It penalizes success. It penalizes thrift practiced in the past and discourages it for the present. It penalizes certain callings and sections of the country and favors others. In some provisions it may be said almost to bear the earmarks of vindictiveness.

My criticism does not refer to the proposed 80% war profits tax. Indeed, I have from the very beginning advocated a high tax on war profits.

The Principles of Taxation

Among the principles of correct and effective taxation, which are axiomatic, are these:

1. No tax should be so burdensome as to extinguish or seriously jeopardize the source from which it derives its productivity.

2. In war time, when the practice of thrift is of more vital importance than ever to the nation, one of the most valuable byproducts which taxation should aim to secure is to compel reduction in individual expenditures.

3. Taxation should be as widely diffused as possible, at however small a rate the minimum contribution may be fixed, if only to give the greatest possible number of citizens an interest to watch governmental expenditure and an incentive to curb governmental extravagance.

It may safely be asserted that our war taxation runs counter to every one of these (and several other) tested principles. While in the case of the rich we discourage saving by the very hugeness of our taxation, or make it impossible, we reach the same undesirable result by opposite means in the case of those with more moderate incomes. The enormous preponderance of saving which could and should be effected does not lie within the possibilities of the relatively small number of rich people, but of the huge number of people with moderate incomes. Moreover, while the rich, in consequence of taxation, limitation of profits, etc., have become less able to spend freely since our entrance into the war, workingmen and farmers, through increased wages, steadier employment and higher prices of crops, respectively, have become able to spend more freely.

Workingmen are in receipt of wages never approached in pre-war times, many of them making incomes a good deal higher than the average professional man, while the profits of business, generally speaking, are on a declining scale and certain branches of business have been brought virtually or even completely to a standstill.

The Distribution of Incomes

Of our total national income, estimated at, say $40,000,000,000 annually, it is safe to say that not more than $2,000,000,000 goes to those with incomes of, say $15,000 and above, while $38,000,000,000 goes to those with lower incomes. Yet we decline to employ one of the most effective means to compel saving, namely, consumption and similar taxes such as every other belligerent nation without exception has imposed. I know it is not popular to say things in criticism of war burdens of a financial nature. One's motives are liable to be misunderstood or misinterpreted, and he is very apt to have it scornfully pointed out to him how small relatively is the sacrifice asked of him, compared with the sacrifice of position, prospects, and life itself, so willingly and proudly offered by the young manhood of the land. It is a natural and effective rejoinder, but it is not a sound or logical one.

Heaven knows, my heart goes out to our splendid boys, and my admiration for their conduct and achievements and my reverence for the spirit which animates them knows no bounds. But I am acquainted with hundreds of business men who bemoan their gray hair and their responsibilities, which prevent them from having the privilege of fighting our foe arms in hand. And I know no American business man worthy of the name who would not willingly give his life and all his possessions if the country's safety and honor required that sacrifice.

But to win the war and to deal with the problems incident to and resulting from it, bravery and patriotic devotion alone are not sufficient. Reason must check emotion, reflection must curb impulse. The effort of sober thought is called for, and the moral courage to speak one's convictions, provided they are those of a loyal American. It is easy to float with the prevailing surface currents of the day, and tempting to attune one's utterances to sentiments which are sure to meet with popular applause. But the value of an exchange of opinions lies in the difference of views honestly held and presented. It is through free discussion, through the meeting of conflicting opinions in the public forum, that the truth is sought and ascertained in a republic.

Paternalism a Real Danger

The picture of bureaucratic paternalism fastening its shackles upon a nation which went to war to preserve liberty is not a fanciful one. Through the accident of war, paternalism at present rules supreme. That is inevitable in war time. The one and supreme task before the nation is to win the war. No personal or business consideration must be permitted to stand in the way of the necessities of that task, and no one must for one moment hesitate to submit to them.

We are not criticising or complaining of the present facts; we are thinking of the future. Officialdom is in possession. It is entrenched in power beyond what it dared to hope for in its fondest dreams. And power is sweet. Officialdom and those who feed at its table will not easily give it up. It is but human nature that they should come really to believe and endeavor to induce the people to believe that it is for the best to leave in the Government's charge permanently much of that which has been confided to it in the stress of the emergency of war.

Bureaucracy has, and will have, an array of plausible arguments to support its plea. Paternalism, under a variety of names and disguises, will have the support of the vast army of these who live or hope to live on its huge patronage. It will have the support of the popularity seeker, the opportunist and the demagogue, and of many who are rightly desirous to further social jus-

tice, but do not go to the effort of painstakingly studying and critically examining, in the light of reason and experience, the ways and means which are available to that end "without doing more harm than good."

The movement will be countenanced by many who do not sufficiently appreciate, in the face of the lessons of all history, ancient and modern, that the only free government which ever has lasted, or ever can last, was and is a government which gives the broadest scope to the individual, limited only by equally broad but wisely conceived regard for the general welfare.

Liberty means neither uniformity nor the rule of mediocrity. Liberty is strong enough and conscious enough of its strength not to fear but to foster individual capacity. If political liberty is not the sum of individual liberties, fairly ordered and reasonably restrained, it is not liberty at all.

It would be a tragedy if it were to be permitted that while our boys are fighting for liberty, the great and splendid structure of ordered and enlightened freedom and convenanted individual rights which was handed down to all Americans should be invaded by that most insidious foe of liberty, paternalism, with its allies and close relatives, bureaucracy and socialism. It would be a grievous affliction if under the emotional stress and turmoil produced by war, our people were to permit doctrines to take a footing on our soil which their sober wisdom heretofore has scornfully rejected as will-o'-the-wisps and as un-American. It would be bitter irony of fate if, while democracy triumphed on the bloody fields of war over that arch representative of the paternalistic system and spirit, Germany, our own governmental and social conceptions and practices were to be infected with the poison of paternalism and bureaucracy.

We must stand together, counsel with each other and work together. We must give voice to our convictions. We must become a militant phalanx in the cause of that which we profoundly believe to be right and wise and just, and making for the greatness of America and the happiness and welfare of her people. The problems of the immediate future loom large before us. That nation which will best know how to combine the dictates of social justice with incentive and protection to individual effort will secure the prize of world leadership no less than of opportunity, well-being and contentment for the masses of its own people.

Manganese Development in Virginia

By Marshall Haney*

War conditions have made it possible and profitable to reopen several manganese mines in Virginia, and many of the operators have realized good profits on small original investments in manganese properties. The old Paddy's Run mine, at present generally known as the Nelson, is situated on a conical-shaped hill in the southwest corner of Frederick County, a few miles from the postoffice of Star Tannery. The nearest shipping point is Capon Road, a station on the Baltimore & Ohio Ry., and 14 miles from the mine.

Old records show that the property was operated in 1832, although the length of operation and production at that time are unknown. Considerable development was done in 1882, and for a period of seven years the mine was actively worked and produced from 2000 to 3000 tons of ore ranging from 45% to 52% manganese. Over 1000 ft. of shaft and tunnel work was done, and this remains in a fair condition, owing to the formation and the fact that the workings are 150 ft. above the local water level. The formation belongs to the Paleozoic era, and the workings occur near the line between the Devonian and Silurian periods. The deposit is associated with what is locally known as flint limestone, which forms many small anticlines and synclines. The ore-bearing formations vary in thickness from two to twelve feet and the veins from a few inches to three feet.

After closing down in 1889, the property remained idle until 1915. Some prospecting by Charles M. Nelson confirmed his opinion that large quantities of high-grade ore could be profitably mined, so he reopened the mine in a small way, and by a one-horse operation shipped several carloads of ore of the following grades:

SORTED MANGANESE ORE PILED READY FOR SHIPMENT

ANALYSIS OF VIRGINIA NELSON MINE MANGANESE-ORE SHIPMENTS

Type	Per Cent. Moisture	Iron	Silica	Phosphorus	Manganese
Hard blue ore	1.57	0.85	1.08	0.227	52.67
Fine soft blue ore	1.60	3.25	5.43	0.257	50.28
Hard black ore	1.58	3.25	7.05	0.226	48.34
Black ore	5.46	1.30	2.05	0.284	49.18
Fine soft black ore	7.65	4.50	5.55	0.261	48.03

Early in 1917 the property was purchased by competent mining men, who have installed a complete plant at a cost of over $50,000 and are now shipping a large quantity of high-grade ore. Results accomplished at this old mine can be duplicated at many other places in the state. The manganese industry, under existing conditions, presents larger possibilities for quick returns on small original investments than any other branch of mining. In order to purchase requisite machinery, many of the small operators have been able to secure large advances on their ore in sight, and the present rate of development should soon materially relieve the shortage in manganese.

*Consulting mining engineer, Geer, Greene County, Virginia.

Mining Men in the Service

CAPT. HARRY L. MEAD

CAPT. STEPHEN L. GOODALE

LIEUT. E. G. SNEDAKER

LIEUT. J. V. RICHARDS

Recording Accidents in Mines*

By ALBERT H. FAY

Accidents are considered from the statistical standpoint, and a plea is made for a more thorough standardization of records. Examples are quoted and tables given to show that fatal accidents are decreasing, in metal mines, whereas non-fatal accidents are increasing. It is pointed out, however, that labor turnover is not always taken into consideration, with the result that statistics from small operators are sometimes of doubtful value. The contention is advanced that greater attention to the details of recording mishaps in mines will lead to real progress in accident prevention and facilitate the compilation of a just and an equitable scale of insurances rates.

WHEN the U. S. Bureau of Mines began the collection of mine-accident statistics, in 1911, the data available concerning the non-fatal injuries in the mining industry were fragmentary and incomplete. Reports of fatal injuries were not as complete as they should have been, but sufficient data had been accumulated to identify the principal hazards. The returns first received and published showed what was then considered a high rate for non-fatal injuries, because there was nothing with which to compare it. In 1911 efforts were made to legislate into existence the Industrial Accident Commissions. The mining companies had not been accustomed to keeping complete records for either the state or Federal Government, and, in many cases, not even for their own use.

The recording of all accidents is absolutely necessary if there is to be a reduction in the number of accidents at mines. Detailed records will give the exact cause of the accident, and, knowing this, remedies will readily suggest themselves in most cases, and such records furnish the safety engineer a reliable mass of data from which he may formulate safety rules and regulations, advise the adoption of safety devices, and point out the advantages of safer methods of mining. To this end the Bureau prepared a form for keeping a record of accidents at mines. On this form is to be recorded the name of the injured person, the date of the accident, the cause, and whether or not the accident was fatal, and also, in non-fatal cases, the degree of disability, measured in days lost, due to the accident. A number of mining companies are keeping such data, and the returns which have been received indicate that the records are being prepared more carefully than was usually the practice in the past. They show an increase in the number of non-fatal accidents which is more apparent than real, because the industry is no more dangerous than when records were not kept. The record simply brings to light the hidden dangers.

In order to bring out more clearly the results of keeping records, Table I has been compiled from the Bureau metal-mine accident publications from 1911 to 1916, inclusive, and refers to the entire United States. This table shows that the fatality rate is decreasing, whereas non-fatal injuries are increasing. In 1911, 170 non-fatal injuries per thousand 300-day workers were reported to the Bureau, and in 1916 the number reported was 250, thus indicating that better records are being kept. The fact that there are fewer fatal accidents indicates increased efficiency in safety and first-aid work.

Table II refers to the quarry industry for the period 1911 to 1916, inclusive, and indicates an increased non-fatal injury rate ranging from 63.8 in 1911 to 175.6 in 1916, per thousand 300-day workers. The fatality rate at the quarries shows practically no change.

By reason of the lack of complete records among the smaller operators of mines and quarries, these figures are entirely too low. This is indicated in Table III, in which data show the returns of 258 companies in 1914, 280 in 1915, and 246 in 1916, all of which are keeping records practically in accordance with the form prescribed by the Bureau. It will be noted that this selected group of mines also shows an increasing non-fatal injury rate, the figures being 331 per thousand 300-day workers in 1914 and 398 in 1916. The fatality rates, however, show a reduction from 4.92 per thousand 300-day workers in 1914 to 4.06 in 1916.

The accident rates at mines, as heretofore published, also appear lower than they actually are, because in so many instances, the operator reports the total number of men on the payroll during the year. By reason of the annual labor turnover, the number of men on the payroll is much larger than the actual number of full-time workers. Hence, in order to get true accident rates, it is necessary that the time the men were employed also be known. Such a record of the hours worked has been kept by the New Jersey Zinc Co., thus placing the accident rates on a basis regarding the exactness or completeness of which there can be no doubt. One of the reasons why the Bureau's rates in earlier years appear low is that it has been difficult to obtain detailed information, which is kept by only a few of the larger companies. The next step was to reduce all accidents to a 300-day basis. This, however, does not take into account the eight-hour or ten-hour day, but in most of the metal mines, in recent years, the eight-hour day has prevailed. Many inequalities have been eliminated by reducing the figures to a common denominator of 300 days. This, however, does not eliminate the payroll discrepancies when the number of men employed is given as per total on payroll.

The increasing completeness in the matter of records is to be credited, in part, to the Bureau's campaign for safer conditions, and also, in no small degree, to results from the annual requests for reports of accidents during the current year, and to the enactment of accident-compensation laws. The mining companies expect to make the returns, and the majority of companies, therefore, are now keeping records in such a condition that they may be able to render reports at the close of the year. There is, however, some lack of uniformity as to what injuries shall be recorded, although it is believed

*A paper presented at the seventh annual congress of the National Safety Council, 1918.

TABLE I. UNITED STATES METAL-MINE ACCIDENTS, 1911–1916

Number of Men Employed, Days' Work Performed, and Number of Men Killed and Injured at All Metal Mines in the United States

Year	Average Days Active	Men Employed — Actual Number	Men Employed — Equivalent in 300-Day Workers (Calculated)	Total Shifts	Number Killed — Total	Number Killed — Per 1000 300-Day Workers (Calculated)	Number Injured — Total	Number Injured — Per 1000 300-Day Workers (Calculated)
1911	282	165,979	156,089	46,826,573	695	4.45	26,577	170.27
1912	287	169,199	161,662	48,498,510	661	4.09	30,734	190.11
1913	288	191,276	183,593	55,077,855	683	3.72	32,971	179.59
1914	271	158,115	142,619	42,785,840	559	3.92	30,216	211.87
1915	280	152,118	141,997	42,599,015	553	3.89	35,295	248.56
1916	282	204,685	192,455	57,736,425	697	3.62	48,237	250.64

TABLE II. ACCIDENTS IN THE QUARRY INDUSTRY, 1911–1916

Number of Men Employed, Days' Work Performed, and Number of Men Killed and Injured at All Quarries in the United States

Year	Average Days Active	Men Employed — Actual Number	Men Employed — Equivalent in 300-Day Workers (Calculated)	Total Shifts	Number Killed — Total	Number Killed — Per 1000 300-Day Workers (Calculated)	Number Injured — Total	Number Injured — Per 1000 300-Day Workers (Calculated)
1911	228	110,954	84,417	25,325,094	188	2.23	5,390	63.85
1912	249	113,105	93,837	28,151,043	213	2.27	6,552	69.82
1913	246	106,278	87,141	26,142,237	183	2.10	7,739	88.81
1914	233	87,936	68,187	20,456,157	180	2.64	7,836	114.92
1915	246	100,740	82,447	24,734,224	148	1.80	9,671	117.30
Average for five years	240	103,802	83,205	24,961,751	182	2.19	7,438	89.39
1916	253	90,797	76,457	22,937,178	173	2.26	13,427	175.62

TABLE III. SUMMARY

Metal-Mine Accident Data Grouped by Methods of Mining During the Year Ended Dec. 31, 1916

Method of Mining	Number Companies Represented	Number States Represented	Days Active	Total Days' Labor	Number Men Employed in Mines	Number 300-Day Workers	Number Killed — Total	Number Killed — Per 1000 Employed	Number Killed — Per 1000 300-Day Workers	Number Injured — Total	Number Injured — Per 1000 Employed	Number Injured — Per 1000 300-Day Workers
1. Room and pillar	62	14	280	2,522,986	9,023	8,410	47	5.21	5.59	4,013	444.90	477.17
2. Overhand stoping:												
(a) With stulls	22	7	324	1,385,778	4,281	4,619	21	4.91	4.55	1,824	426.17	394.81
(b) With square sets, cribs, etc	32	10	326	4,695,937	14,385	15,653	55	3.82	3.51	7,661	532.38	489.52
(c) With filling	21	10	329	2,031,454	6,170	6,771	35	5.67	5.17	2,584	418.80	381.68
(d) Shrinkage	13	7	351	958,754	2,729	3,196	14	5.13	4.38	1,129	413.56	352.81
3. Underhand stoping	5	5	306	1,113,333	3,635	3,711	12	3.30	3.23	1,707	496.43	460.11
4. Caving methods	61	7	301	6,121,033	20,326	20,403	80	3.93	3.92	7,134	350.91	349.71
5. Open pit, with steam shovel	23	7	283	2,574,733	9,100	8,582	27	2.97	3.15	2,416	265.49	281.58
6. Open pit, without steam shovel	7	5	265	92,319	348	308	..	....	....	108	308.57	348.39
Total, 1916	246	...	307	21,496,327	69,997	71,653	291	4.16	4.06	28,576	408.23	398.82
1915	280	...	303	22,842,999	75,365	76,140	324	4.29	4.25	27,314	362.42	358.73
1914	258	...	292	22,004,824	75,453	73,349	361	4.78	4.92	24,306	322.13	331.38

TABLE IV. NON-FATAL INJURIES, 1916–1917

Injuries by Causes Obtained From the Records of the New Jersey Zinc Company

Causes	Injuries, 1916 and 1917 — Number(a)	Per 1000 300-Day Workers	Number (b)	Per 1000 300-Day Workers	Injuries, 1914 to 1917 — Number (a)	Per 1000 300-Day Workers	Number (b)	Per 1000 300-Day Workers
Fall of rock or ore from roof or wall	44	25.17	184	105.26	78	26.05	338	112.86
Rock or ore while loading at working face	69	39.47	365	208.81	101	33.72	499	166.61
Timber or hand tools	31	17.74	226	129.29	93	31.05	617	206.01
Explosives	16	9.15	24	13.73	25	8.35	37	12.35
Haulage	39	22.31	81	46.34	82	27.38	255	85.14
Falling down chute, winze, raise, or stope	25	14.30	69	39.47	49	16.36	139	46.41
Run of ore from chute or pocket	9	5.15	31	17.74	36	12.02	216	72.12
Drilling, machine or hand	20	11.44	131	74.94	54	18.03	299	99.84
Electricity	2	1.15	4	2.29	3	1.00	9	3.01
Machinery	..	.....	2	1.14	..	.....	3	1.00
Nails	..	.....	2	1.14	1	0.33	14	4.67
Sledging chunks and mucking	5	2.86	12	6.87	23	7.68	137	45.74
Other causes	19	10.87	133	76.09	26	8.68	184	61.44
Total underground	279	159.61	1,264	723.11	571	190.65	2,747	917.20
Falling down shafts	2	1.14	3	1.72	2	0.67	3	1.00
Objects falling down shafts	..	.....	....	.....	...	.....	1	0.33
Overwinding	1	0.57	1	0.57	1	0.33	1	0.33
Skip, cage, or bucket	1	0.57	5	2.86	1	0.33	6	2.00
Other causes	3	1.72	14	8.01	3	1.00	15	5.01
Total shaft	7	4.00	23	13.16	7	2.34	26	8.68
Total underground and shaft	286	163.62	1,287	736.27	578	192.99	2,773	925.88
Surface haulage	...	.....	1	0.57	...	.....	1	0.33
Railway cars and locomotives	...	.....	....	.....	...	.....	....	.....
Run of ore from bin	1	0.57	1	0.57	1	0.33	1	0.33
Falls of persons	1	0.57	4	2.29	2	0.67	6	2.00
Hand tools, axes, bars, etc	4	2.29	12	6.87	6	.....	15	5.01
Machinery	1	0.57	2	1.14	2	0.67	3	1.00
Other causes	5	2.86	29	16.59	7	.....	42	14.02
Total surface	12	6.86	49	28.03	18	6.01	68	22.70
Falls or slides of rock or ore	8	4.58	24	13.73	14	4.67	48	16.03
Haulage (cars, locomotives, etc.)	1	0.57	4	2.29	3	1.00	16	5.34
Falls of persons	3	1.72	13	7.44	9	3.01	41	13.69
Machinery	1	0.57	6	3.43	3	1.00	13	4.34
Hand tools	...	.....	8	4.58	2	0.67	35	11.69
Sledging chunks and mucking	...	.....	2	1.14	11	3.67	32	10.68
Other causes	9	5.15	33	18.88	9	3.01	34	11.35
Total open cut	22	12.59	90	51.49	51	17.03	219	73.12
Total open cut and surface	34	19.45	139	79.52	69	23.04	287	95.82
Grand total	320	183.07	1,426	815.79	647	216.03	3,060	1,021.70
Hours labor worked			4,195,412				7,187,504	
8-hour shifts			524,427				898,438	
300-day workers			1,748				2,995	
300-day workers, per year			874				749	

(a) Includes all injuries except fatal and trivial. (b) Includes all injuries except fatal.

that the larger companies are recording practically all that occur. Accidents reported to the Bureau are only those which cause disability of one day or more. It is not expected that accidents causing a disability of less than one day will be reported, although in some cases it is believed they are included.

Such figures, however, are not as complete as they may be, as is shown by the New Jersey Zinc Co.'s report for the period of four years, in which it is believed every non-fatal injury that caused loss of time has been recorded. Reference is pertinent to a paper prepared by B. F. Tillson, entitled, "Recording Accidents, and Safety Measures Employed by the New Jersey Zinc Co.," published in the *Journal* of Apr. 17, 1917, which gives a detailed description of the system used by that company in keeping records of accidents, together with methods of determining rates for comparative purposes. Information is given as to what had been done in the matter of safety improvements, and concerning methods employed among the foremen and shift bosses to reduce accidents.

Mr. Tillson's paper shows that for the first four months of the year 1913, without special safety organization, but with complete records, the non-fatal injuries at the mines which caused loss of time amounted to 2.24 per 10,000 hours of labor performed. In the last eight months of 1913, during which the safety-first campaign was started, the accident rate was reduced to 2.17. The organization was further perfected in 1914 and 1915, with the result that in 1916 the non-fatal injury rate was 0.77 per 10,000 hours, and in 1917 the rate was 0.78. By keeping detailed records, the company has been able to determine the principal causes of accidents, and to apply remedies therefor. By an educational campaign among the employees, and by the giving of bonuses to the shift bosses, reduction in the number of accidents has been marked. The records of the company not only show accidents by causes, but by occupations, and also chart them according to the actual number of hours employed in the mines.

Through the courtesy of the New Jersey Zinc Co., I am able to present a summary of the non-fatal injury figures for the two-year period 1916 and 1917; also a summary for a four-year period, 1914 to 1917, according to causes, as shown in Table IV. The accident data classified by occupations is given in Table V, in which is shown not only the occupations, but the hours' work performed in each occupation, the number of injuries and the number of injuries per thousand 300-day workers. It also shows the number of hours lost per accident in each occupation and the total number of hours lost in each occupation as the result of accidents. The trivial injuries referred to in this table include all such accidents as do not prevent the men from returning to work the next day, or, in other words, they do not include those which record only the loss of the remainder of the shift.

Although these records are as complete as it is possible to make them, they represent the returns from only one company, and it is doubtful whether the figures are sufficiently large to be thoroughly fair to each occupation, or even to each cause of injury. Data compiled by a large number of companies on this plan would undoubtedly furnish a reliable basis on which to study accidents and their causes, and at the same time give sufficient information to make it possible to establish equitable insurance rates.

Exact records should contain sufficient data to show the causes of all accidents—hazards by occupations, as in Table V; hazards by mining methods, as shown in Table III; and the days and hours worked and the time lost per accident, as in Table V. This would serve as a basis for insurance rates that would be fair to all. Such records would also show the real progress that is being made in accident prevention.

TABLE V. CLASSIFICATION BY OCCUPATIONS

New Jersey Zinc Co. Accident Data, 1916 and 1917, by Occupations

Occupations	Hours Labor Worked	300-Day Workers	Injuries (a) Number	Injuries (a) Per Cent. of Total	Injuries (a) Per 1000 300-Day Workers	Injuries (b) Number	Injuries (b) Per Cent. of Total	Injuries (b) Per 1000 300-Day Workers	Number of Accidents (c)	Total Hours Lost by Accidents (c)	Hours Lost Per Accident (c)
Muckers	996,535	415	81	25 31	197.59	350	24 61	843.37	350	7,104	20.3
Timbermen	781,769	326	51	15 94	156.44	233	16 39	714.72	233	6,930	29.7
Trammers	751,550	313	63	19 69	201.28	273	19.20	872 20	273	5,368	19.7
Runners, drill	564,832	235	72	22.50	306 38	323	22.72	1,374 47	323	7,934	24 6
Helpers	194,394	81	7	2.19	86.42	45	3.17	555 56	45	392	8 7
Ground trimmers	106,385	44	10	3.13	227 27	33	2.32	750 00	33	1,896	57.5
Pipemen	88,058	37	4	1.25	108.11	31	2.18	837 84	31	168	5.4
Nippers	79,123	33	3	0 94	90 91	15	1.05	454 54	15	400	26.7
Bosses	76,999	32	5	1.56	156.25	18	1.27	562 50	18	536	29 8
Motormen	45,621	19	2	0.62	105.26	8	0 56	421 05	8	24	3.0
Trackmen	45,920	19	0	.....	.....	9	0 63	473 68	9	0	.....
Chutemen	44,925	19	2	0 62	105.26	10	0.70	526 32	10	16	1.6
Blockholers	37,746	16	2	0 62	125.00	11	0 77	687 50	11	72	6 5
Car repairmen	15,023	6	3	0.94	500 00	6	0 42	1,000 00	6	80	13.3
Miscellaneous	184,024	77	15	4.69	194.81	57	4.01	740 26	57	987	17.3
Total	4,012,904	1,672	320	100.00	191.99	1,422	100.00	850.48	1,422 (c)	31,907	22.44

(a) Includes all injuries except fatal and trivial.
(b) Includes all injuries except fatal.
(c) Does not include 3 trivial accidents to ore loaders and 1 trivial accident to linemen in 1917, as these occupations were free from accidents in 1916 and the time of exposure to risk in the latter year could not be segregated.

Duty To Replace Mining Machinery

BY A. L. H. STREET*

A mine was leased under a contract binding the lessee to operate the mine continuously, "keeping the machinery in as good working order as when he takes possession 10 days hence, less the natural wear and tear of the same." While the lessee was in possession, an unusual flood practically destroyed the mill on the mine premises, and he did not restore it, although he continued to mine ore. Under these circumstances, the Arkansas Supreme Court holds that the lessee was guilty of a breach of the lease in failing to rebuild the plant within a reasonable time, entitling the lessor to terminate the lease. (Bradley *vs.* Holliman, *202 Southwestern Reporter, 469.*)

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Mining in Northern Manitoba

By J. A. CAMPBELL*

The area included in the mineral districts of Northern Manitoba, now in process of development, is in the form of a triangle, of which the apex is The Pas; the westerly side is formed by the Saskatchewan River and connecting lakes; the east side by the Hudson Bay Ry., and the base extends from Lake Athapapuskow to Herb Lake. Owing to transportation difficulties the development of properties has been retarded, but recent exploration has proved the presence of rich deposits, and some successful operations have been and are now being carried on.

UNTIL recently the known mineral area of Northern Manitoba was confined practically to that lake and river district stretching from Lake Athapapuskow and the Saskatchewan boundary, on the west, to Wekusko, or Herb Lake, on the east, a distance of approximately 100 miles. Lake Athapapuskow is reached by means of the Ross Navigation Co.'s steamers, which give regular summer service from The Pas to Sturgeon Landing via the Saskatchewan River, and Cumberland and Sturgeon lakes. From Sturgeon Landing to Lake Athapapuskow is 16 miles, and a road built by the Manitoba government is of material assistance in the haulage of machinery, supplies and other freight. There is also an alternative canoe route, via Sturgeon and Goose rivers and Goose Lake, connecting with the terminus of the government road at Lake Athapapuskow, by a three-mile portage.

Eastern End of the District More Accessible

The other end of the district at Herb Lake is more easily reached by means of the Hudson Bay Ry. from The Pas to Mile 82. From there a government road, locally known as the "Gordon Highway," extends to McKay's Landing, at the south end of the lake, a distance of 11 miles. Mining properties already discovered begin at a point about five miles north of this landing and extend to the northern end of the lake. Mineral discoveries in this district were first made at each end of the mineral area, because of the accessibility of these points, and it is here that active development and mining operations are now being carried on.

Sulphide Ore Deposits at Flin Flon Lake

The great sulphide mine at Flin Flon Lake was located in August, 1915, and the richness of the deposits has indicated that copper must be considered one of the important mineral resources of the North. Thomas Creighton, the original discoverer, was one of a group of six prospectors sent out to examine the district by a group of Toronto capitalists and mining men known as the Hammill-Currie-Fasken syndicate. Ten claims were staked, and steps immediately taken to determine the quality and extent of the orebody. By stripping and trenching, it was found that the ore deposit is approximately 2000 ft. long, narrowest at the north end and widest at the south end, where it enters the lake, being about 300 ft. wide at that point. It consists of a vast deposit of solid sulphide. Sampling and resampling indicated that at normal return the ore would realize $10 to the ton in gold, copper and silver, the copper content averaging 1¼%. This discovery attracted wide attention, and though various propositions have been submitted to the original owners, no outright sale has yet been effected. Others have become interested in the property, and it is now in control of a syndicate under the management of David Fasken and John H. Black, of Toronto.

Extensive Orebody Shown by Drilling at Great Sulphide Mine

Some months following the discovery, a contract was let to diamond drill the property. A complete drilling outfit, supplies and equipment were taken in during the winter, and a camp was established on the lake shore. On Mar. 26, 1916, two drills were started, and they continued operations until July 15 of the same year. Further contracts were subsequently let, and the drills have now been operated constantly for nearly two years, $200,000 having been spent in this and other work of investigation. But the expenditure has been justified, for the drilling has resulted in proving more than 20,000,000 tons of sulphide ore which will yield from $8 to $10 per ton at normal prices.

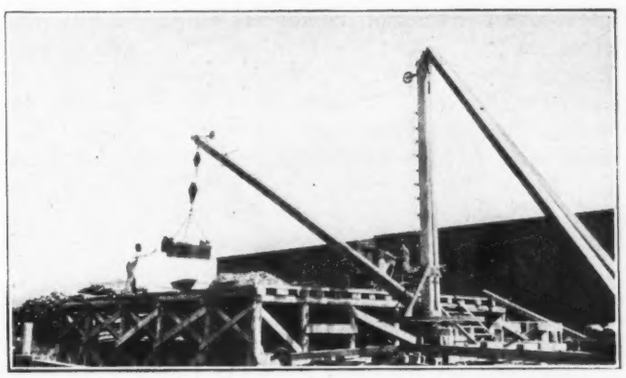
Schist Lake Deposits Smaller but Richer Than Those at Flin Flon

Operations at the Mandy Mine, at Schist Lake, are remarkable in that the ore, after being mined, is hauled 40 miles by team, shipped 125 miles by boat and barge to The Pas, and from there by rail to the Trail smeltery at Trail, B. C. The discovery of this deposit was made in October, 1915, by F. C. Jackson, a sub-contractor on the Hudson Bay Ry., and S. S. Reynolds, a prospector of some experience. J. E. Spurr, vice president of the Tonopah Mining Co., was in the district at the time and inspected the claims staked. The result was that, before he left, an agreement was entered into by which the Tonopah Mining Co. was to take over the property and to develop and operate it. A subsidiary, known as the Mandy Mining Co., was formed for this purpose, and in the summer of 1916 $40,000 was spent in diamond drilling, trenching and other preliminary work. This exploration proved more than 100,000 tons of ore in one lens which assayed about 20% copper, some zinc and approximately $5 a ton in gold and silver.

The decision to place the mine in the producing class was reached the latter part of December, 1916, and a contract to haul 3000 tons 40 miles to the head of navigation at Sturgeon Landing was let to C. B. Morgan. By the spring break-up 3335 tons had been deposited at the landing, with the exception of a small amount which had been teamed all the way to The Pas. The ore was mined by open cut, the only machinery used

*The Pas, Manitoba.

being a couple of steam drills and a horse derrick. Ore shipped to the Trail smeltery during the summer of 1917 contained 337 oz. gold, 60 oz. silver, and 1,113,935 lb. of copper. During that summer a complete mining equipment, which had been taken in during the preceding winter, was installed. The main shaft was sunk to the 200 level, and two drifts were driven in the orebody. The company also placed in operation a 52-ft. tug on Lake Athapapuskow and a small stern-wheel steamer on Schist Lake, together with a number of large barges. By this means some of the ore was transported part of the distance by water, which lessened the winter team haul to a considerable extent. Last



TRANSFERRING ORE FROM BARGE AT THE PAS RIVER TO CARS FOR SHIPMENT TO TRAIL SMELTERY

winter the same contractor hauled 8600 tons to Sturgeon Landing, from which point it is taken by the Ross Navigation Co. steamers to Trail. A spur track of the Canadian Northern Ry. at The Pas connects the main line with the dock, and this facilitates the work of transshipment.

Deposits of the Lake Athapapuskow District

In the Lake Athapapuskow district, the Chica claims, situated on the Pine Root River, are being thoroughly prospected, and a diamond drill has been working there for several months. Other claims in the neighborhood give promise of satisfactory results. On the north shore of the east arm of Lake Athapapuskow discoveries have recently been made which indicate the existence of a large body of sulphide ore, carrying from 2½% to 3% copper. According to report, it is estimated that this district will rival the Flin Flon discovery in extent and in the quality of the ore deposits.

The Herb Lake Gold Mining District

The first important mineral discovery of the North was made during the summer of 1914, at Wekusko, or Herb Lake, as it is now generally known, by Hackett and Woosey. The first claims staked were the Kiski and Wekusko, which were located following the discovery a vein of gold-bearing quartz which showed considerable free gold. The find attracted wide attention, and soon the entire shore of the lake north of the abovementioned claims and for some distance in was staked.

Among the claims subsequently located were those of the Rex group, staked by Campbell, Hassett and Moore, and these properties have since become the best known in the district and now contain a producing mine. The preliminary work of stripping and trenching exposed a vein of such promise that a deal was consummated with Makeever Brothers, mine operators of New York and Boston, whereby they undertook to develop the property, build a mill and carry on the mining work. In sinking a shaft it was found that the width of the vein increased with the depth. Two shafts have been sunk, one to a depth of 120 ft., and considerable drifting has been done. Upon completion of the road from the railway to the lake last summer, a portable sawmill was taken in to prepare lumber for mine buildings, and buildings were erected and machinery was installed during the winter. Machinery and equipment include a 10-ft. 40-ton Lane mill, amalgamation plates, Deister-Overstrom concentrating tables, a 55-hp. engine, two 60-hp. return-tubular boilers and a 390-cu.ft. air compressor. The Rex mill started crushing ore on May 1, 1918, and, with small interruptions for adjustments and cleaning, has operated continuously since that time. The first clean-up, from 433 tons of ore crushed, resulted in a sponge containing 365 oz. gold, 82% fine, having a value of $6186.53. Similar results were obtained from the next run of ore. A few months ago a company known as the Herb Lake Gold Mines, Ltd., was formed, the stock being held mainly by Makeever Brothers and the original owners of the claims.

Other Properties in the Herb Lake District

The Northern Manitoba Mining and Development Co. was the first to make an ore shipment from the Herb Lake district. This company owns the Moosehorn claim, where an 80-ft. shaft has been sunk. A trial shipment which was sent to the Trail smeltery consisted of 57,000 lb. of gold-bearing quartz, taken from the

COPPER ORE DUMP AT STURGEON LANDING, MANITOBA

shaft. The returns for the whole car were $2323.60 or $81.53 per ton. Local capital has been insufficient to work the property satisfactorily, so an interest therein has been disposed of to Mekeever Brothers, who have undertaken to proceed with the development work and mining operations. As this mine is near the Rex, the two properties can be worked together advantageously.

Another well-known group consists of the Elizabeth-Dauphin claims, where considerable work has been done, including the sinking of a 50-ft. shaft. The Pas Consolidated Mines, Ltd., controls this property, and expects to carry on considerable development work during the current year. Shallow shafts have been sunk on several other claims, particularly the Syndicate, Kiski-Wekusko and McCafferty.

A recent discovery which is attracting attention is

that made by Paul Gasse and associates at the northern end of Herb Lake, where a pegmatite dike showing considerable development of quartz in stringers and irregular masses occurs in the granite, which has hitherto been avoided by local prospectors. The width of mineralization is from 10 to 50 ft. and the length is not yet determined, but appears to be extensive. A number of samples have been assayed, and the results are promising. The discoverers are doing the usual preliminary work on the property in order to get a general idea of the extent and character of the deposits.

A new field has been discovered at Knee Lake, near Oxford House, on the Hayes River. Several prospectors working for an English syndicate have recently recorded a number of claims, and the discovery of low-grade gold quartz and surface examinations there indicate a large orebody of uniform quality.

Australian Lead, Silver and Zinc

SYDNEY, N. S. W., CORRESPONDENCE

The first half of 1918 shows an increased output of silver, lead and zinc in Australia, as compared with the production in the latter half of 1917, which was sub-normal, owing to strikes. The chief centers are Broken Hill, New South Wales; Zeehan, Tasmania, and Northampton, W. A., but a small output is obtained from Yeranderie, N. S. W. Fully 96% of the total production, apart from silver recovered from blister copper, comes from Broken Hill. The lead concentrates are treated at three works—the Associated Smelters plant, at Port Pirie; the Sulphide Corporation plant, at Cockle Creek, N. S. W., and the Fremantle Trading Works, at Fremantle, West Australia.

Operations at the Port Pirie plant are confined practically to the treatment of the Broken Hill outputs, other than Central Mines products, which are owned by the Sulphide Corporation and smelted at its works. These works also take ores from Zeehan, Yeranderie, and elsewhere, as well as all suitable gold concentrates. The Fremantle works smelt the products from their mines at Northampton, as well as small lots of customs ores and concentrates. The zinc concentrates are treated at two plants—those at Risdon, Tasmania, of the Amalgamated Zinc Co., taking roasted Broken Hill concentrates and making electro-spelter at the rate of about 10 tons daily, and those at Port Pirie, making spelter by the distillation process at a smaller rate than at the Risdon works. New lead and zinc plants in connection with the Hercules-Roseberry mines, of Tasmania, are not yet built, although projected by the Mount Lyell Co., which practically owns these mines.

The present Broken Hill methods are the outcome of many years of trial and failure, and of much hard work and invention. The present process is by wet milling the ores, and four products are obtained—lead concentrates, zinc sands, slimes, and barren tailings. The lead concentrates are smelted at the above-named works; the zinc sands are further treated by flotation, and give flotation lead concentrates and flotation zinc concentrates and slimes. The two products of slimes are further treated by various modifications of the selective flotation processes to produce slime lead concentrates and slime zinc concentrates.

The total ore milled during the first half of 1918 at Broken Hill was about 410,000 tons, the sands treated amounted to 222,000 tons, and the products consisted of about 106 000 tons of lead concentrates and 142,000 tons of zinc concentrates. Not all the lead or zinc concentrates came from the above-mentioned quantity of ore. Of the 10 companies concerned with this output, two, the Zinc Corporation and Amalgamated Zinc, treat old zinc sands accumulated before the institution of the flotation processes, and produce a little lead concentrate therefrom and much zinc concentrate. The accumulated slime is also treated, and this accounts for about 7% of the total of 106,000 tons of lead concentrate.

The Zinc Corporation treats three materials—the old zinc sands purchased, the ores from their own mine, the South Blocks, and the current output of zinc sands from the North and South mines. The Amalgamated Zinc Co.—the pioneer of flotation process work—treats almost exclusively old zinc sands which have been purchased. The largest producer for the year was the South Mine, with 19,000 tons of lead concentrates. Next came the Broken Hill Proprietary Co., with 16,300 tons. The largest producer of zinc concentrate was also the Broken Hill Proprietary Co., with 42,000 tons, followed by the Amalgamated Zinc Co., with 40,000 tons.

It must not be concluded that the Proprietary Co.'s mine is today the largest; it has only a short life on present reserves, and the large output is chiefly from accumulated zinc sands and slimes. Unlike most other companies in this field, the Proprietary sold none of its old sands. Of the nine companies with mills, all except two have flotation plants in operation. Each of these is about to complete the fulfillment of a long-period contract with the Zinc Corporation for the treatment of current zinc sands. The Broken Hill South Co. already has its flotation plant, and it was recently announced that the North Mine had decided to follow its example.

The mines in the field will have a life of considerably more than 10 years, on present reserves and outputs, but one or two may drop out. Present production is just about the capacity of the two works, which take the outputs of the various properties, and produce soft lead, fine gold, and fine silver.

The disposal of the metal is in the hands of the Australian Associations, which, through the Federal government, have been able to sell all the lead to the Imperial government, and have also made good arrangements for future disposal of the large amounts of zinc concentrate now stacked in Australia. Freighting has been the chief difficulty, and there are never enough ships to transport all the soft lead made. As for the zinc concentrates, the normal output could be greatly exceeded. Even the present amount cannot be shipped, and, if it could, there are no works in England large enough to take it all. The whole question is now in the hands of the Minerals Imperial Bureau in London, and no one doubts its ability to satisfactorily solve all the problems with which it is concerned.

The only appreciable increase in outputs of lead, silver and zinc in Australia will come from the Hercules-Roseberry fields, and it may be one or two years before this materializes.

Today is an opportune time to send a check for the Comfort Fund of the 27th Engineers.

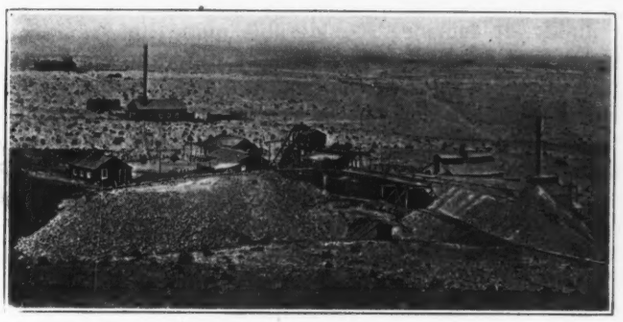
Arizona United Mining Company

BY HARRY E. SCOTT*

The Arizona United Mining Co. is now operating the Arizona United mine, formerly known as the Republic mine, in the Johnson-Dragoon district of Cochise County, Ariz. The Goodrich-Lockhart interests operated the property for the last three years, under the name of the Cobriza Mines and Development Corporation, although the mine was first worked about 45 years ago by the Arizona United company.

An eight-mile railroad connects the mine with the main line of the Southern Pacific at Dragoon, and all supplies, including oil, coal and timber, are brought in over this route. The empty cars are set at the chutes at the collar of the shaft, and ore is dumped direct from mine cars to the standard-gage railroad cars.

The mine is worked through a 1300-ft. incline shaft, and hoisting is done by a 50-hp. Western gasoline hoist, using skips. Extensive development work has been carried on at each level, and a large tonnage of ore is blocked out. Several years ago a smeltery was built to treat the ore from the Republic and other mines in the district, but this has since been dismantled, and the ore



ARIZONA UNITED MINE, IN JOHNSON-DRAGOON DISTRICT OF ARIZONA

is now shipped to El Paso and Douglas, where better results are being obtained.

The management of the Arizona United company contemplates building a mill to treat low-grade ores, of which there is a large tonnage already blocked out. A water supply can be developed sufficient for the operation of a concentrator large enough to treat the ore of the entire district, although the shortage of building material and slow delivery of machinery would necessarily delay the erection of such a plant.

The power plant is equipped with a 200-hp. oil-burning boiler, an Imperial, Type-10, Ingersoll-Rand steam-driven compressor, and a small high-speed engine which is used to drive the generator that furnishes lights for the mine and dwellings. A Sullivan sharpener and drill press are installed in the blacksmith shop.

The labor turnover is smaller than at most properties in the Southwest, owing to the fact that the management has built a number of houses provided with electric lights, water and sewer connections. The dwellings are furnished the married men free of charge, and kept in repair. Coal is supplied at cost plus the freight. The single men occupy smaller cabins, which are furnished them free of charge, including coal. A first-class boarding house is maintained at the mine.

*Johnson, Arizona.

Operations are superintended by J. M. Libby. The main office is in Philadelphia, and the officers of the company are Alfred S. Miller, president; Alfred C. Harmer, Jr., vice president and general manager; David H. Ross, treasurer, and Alfred H. Miller, secretary, all of Philadelphia.

Zinc and Its Uses

On account of the enormous strain on the supply of non-ferrous metals, especially tin plate and aluminum, zinc is assuming a position of greater importance in the industrial world than ever before. Experiments have recently brought to light the fact that rolled zinc has previously unrecognized qualities that will insure its increased use both at present and after the war.

For some time manufacturers have been urged, as a matter of patriotism, to use metals other than tin plate and aluminum in the production of certain commodities. As a result, the "Make It of Zinc" slogan was adopted. That this suggestion has been acted upon will be evident from a perusal of a new list of zinc products which the New Jersey Zinc Co. has compiled. The manufacture of such things as pencil tips, shaving-soap containers, trouser buttons, bottle covers, boxes and linings, addressing plates, stencils, and scores of others, is the outcome of this campaign. The new practice has achieved the result desired by the Government in the matter of conserving tinned iron, and in keeping up the supply of material to those essential industries which were almost cut off from tin and aluminum on account of the reduction in imports consequent on abnormally unfavorable shipping conditions.

"Zinc is just coming into its own" said E. V. Peters, assistant general sales manager of the New Jersey Zinc Co., at the Chemical Exposition recently held in New York. "Extensive research has indicated that this metal possesses the essential qualities needed for metal products of the non-ferrous class. The response to the Government's request for such a replacement metal has brought to light convincing evidence of the wide scope of the usefulness of zinc. Few realize the numerous services to which zinc products can be put. For instance, it is not generally known that zinc oxide forms a considerable proportion of the material composing an automobile or truck tire; or that it gives tires and other rubber goods resiliency and durability.

"Zinc oxide also gives wearing quality to paint. This material, when used in conjunction with white lead sulphate, insures toughness, luster and color constancy to paint—qualities that are essential in this age of conservation. Spelter or metallic zinc, made from the uniquely pure Franklin, N. J., ore, is, with copper, a component of high-grade brass. It is used to galvanize telephone and telegraph wires, to keep them from rusting and becoming brittle, and has an extensive field of usefulness in many other ways.

"It has been demonstrated that rolled zinc can be easily drawn and spun, and that the high-grade quality, such as that produced from 'Horse Head' spelter, is not brittle and takes as high a polish as may be desired. America will be expected after the war, to supply several countries of the Old World now in the throes of the great struggle. They must be rebuilt; and a long time will elapse before their own resources,

such as reëstablishment of manufacturing plants and the procurement of materials, can be available again. Much zinc will, therefore, be required from America to aid in the rebuilding program.

"American zinc fields are both accessible and almost inexhaustible, and the facilities of the country, which were increased soon after the requirements of the Allied countries became apparent at the beginning of the war, are ample to meet the expected demands. Zinc roofing, being non-corrosive, will be needed in large quantities during the reconstruction period. In America, as well as in Europe, zinc, as a roofing material, has been much used in the past. In fact, its non-rusting property is a quality already attracting much favorable attention on the part of manufacturers. Weather strips made of zinc have been used in all climates for years, and the metal has proved entirely suitable for such purpose.

"For hardware, zinc has likewise demonstrated its utility. It is used for doorknobs, door casings, window sashes and fixtures, thus opening an entirely new field of use for the metal. Consumption of zinc along these lines promises to increase when building activities are again renewed on an extensive scale. Zinc is the logical material to use for making leaders and gutters, because of its ability to withstand outdoor corrosion; and in such apparatus as electric fuses it is the standard metal. Sulphuric acid, an important ingredient in fertilizers, is produced from sulphur found in Western zinc ores. This product will grow in importance after the war, on account of increased crop production in various parts of the world. Zinc dust, another form in which the metal is used, is in extensive demand in the dyeing industry, in connection with the recovery of gold and silver by the cyanide process, and also for the manufacture of non-corrosive marine paint."

Manganese Ores in Utah

Manganese ores occur in several places in the area extending from Utah Lake southwestward 75 miles or more and that embraces parts of Utah, Tooele, and Juab counties, states a U. S. Geological Survey bulletin. Most of the development work has been done in the central part of this area, in the Tintic and West Tintic or Erickson mining districts. The deposits elsewhere are reported to be wholly undeveloped or opened only by shallow workings. Several manganese deposits are partly explored by workings made, during the last 40 years, in search of silver and lead ores. Small amounts of manganese ores and manganiferous iron ores have been produced in the Tintic region for use as flux in lead and silver smelteries. The Tip Top tunnel, at Homansville, and the Black Jack group, in the West Tintic district, are now producing high-grade manganese ore. Other mines in which considerable bodies of manganese ore are found are the Baby Elephant group, Queen Mary, Indian Boy, May Farmer, and Eutonia. Undeveloped outcrops of manganiferous material, similar to that in outcrops of developed orebodies, are numerous.

The production in the West Tintic district could be increased if reasonably cheap transportation to the railroad was available. Ores of different grades are more or less intimately mixed in most of the deposits, and it is uncertain whether the grades can be readily separated either by selective mining or by an easy method of concentration. Estimates indicate that there is in sight more than 500 tons of ore carrying 40% of manganese and between 8 and 12% of silica, and probably in reserve more than 3000 tons of ore of this grade. The reserve of ore carrying 25 to 40% manganese and high silica will probably exceed 10,000 tons.

The orebodies form irregular branching pods, lenses, or pipes that lie along the upper parts of jaspery quartz lodes in limestone, quartzite, or shale. Most of them extend nearly to the surface, and the lower limit of two or three is about 100 ft. The largest bodies yet developed are at least 100 ft. long and 15 to 20 ft. in diameter in their widest parts. The orebody at the Tip Top has yielded about 27,000 cu.ft. of manganiferous material, and is not yet exhausted. About two-thirds of this material, or 1200 tons, was sorted as high-grade ore. At two mines, the Baby Elephant No. 1 and the Eutonia, the water level, which is about 100 ft. below the surface, marks a rather abrupt change from manganese oxides above to rhodonite below. The workings at the other mines have not penetrated below the oxidized zone.

The ore is a mixture of manganese oxides, chiefly pyrolusite and wad. Although most of it is soft and crumbly, it includes considerable quantities of rather tough and compact wad. Ores of different grades are intermixed in most of the deposits, and it is a question whether the grades can be readily separated by selective mining or easy methods of concentration. Jaspery quartz is more or less intimately mixed with the ore, and streaks of a soft gray or yellow clay, apparently a decomposition product of the wall rock, are common. The lodes in which the manganiferous bodies occur are persistent and are apparently of deep-seated origin, and all contain more or less silver and lead.

Mount Morgan Co., Queensland

Mount Morgan Co., for the year ended June 2, 1918, reports a revenue from all sources of £1,233,983 3s 4d, and expenditure, including development and depreciation, £981,233 18s 4d, leaving a surplus of £252,749 5s. Dividends paid during the period amounted to £250,000, the balance from the previous account was £95,986 6s, and the balance carried forward was £98,735 11s.

The concentrator treated 214,989 tons of ore and produced 83,567 tons of concentrates. The smeltery and refinery made an output of 7619 tons of refined copper and 86,219 oz. of gold. The ore reserves at the date of the issuance of the report were estimated at 3,825,685 tons, as compared with 3,942,029 tons on Nov. 25 last. The grade of the reserves remains practically stationary at 2.58% copper and 6.16% gold.

Artificial Graphite may be prepared (Swedish patent No. 4330, Nov. 28, 1917, reported in *Chemical Abstracts*) by a method in which oxides of the heavy metals, such as Fe_2O_3, together with $Ca_3(PO_4)_2$, are added to the distillation residues from calcium sulphite cellulose manufacture and the mass is heated to a high temperature in vacuum, in a state of compression. The product is freed from impurities by treatment with acids, sliming and drying, amorphous C is added, and this mixture is used for the production of pure graphite.

Sound Statesmanship in Dealing With Oil Problems*

It is important in these times of swift and sometimes violent readjustments that every landmark of sound Government policy be pointed out and preserved. It has been intimated in a published article that Mark L. Requa, director of the oil division of the Fuel Administration, has undertaken his task with a belief in the principle of Government control and operation of the oil industry during the war. It was suggested that Mr. Requa, upon becoming better acquainted with the point of view of the leaders in the petroleum industry, had changed his mind and was now of the opinion that the oil industry should regulate itself.

As a matter of fact, the acts and utterances of Mr. Requa show, the official record proves, that since its initiation the oil division of the Fuel Administration has been as a rock seeking to hold as long as possible to the doctrine that Government control and operation of the oil industry should be avoided to the utmost limits.

When Mr. Requa took office he requested that the oil industry itself constitute a representative and responsible committee upon whose judgment and advice it would be prepared to rely, and that that committee should serve as a medium through which the Government might advise with and communicate with the industry as a whole, the Government, however, retaining the prerogative of final decision. This was the origin of the formation of the National Petroleum War Service Committee. Of that committee Mr. Requa, in an address at Tulsa, Okla., on July 22, said before a large gathering of oil men:

> The national committee and the subcommittees are preëminently volunteer organizations formed for the purpose of placing for war needs most completely and efficiently at Government command the combined resources and activities of the petroleum industry. It has an important function to perform in the matter of fair prices. The knowledge of its members, freely given to the Government for the asking, is of greatest value. The national committee and the subcommittees deserve, I am sure, the confidence, not only of the industry, but of the Fuel Administration.

The relationships between the Government and this committee present a happy suggestion of a model plan of regulating great industries in America. The committee sits regularly and considers every question of interest to the industry which may be referred to it by the Government; Mr. Requa and other representatives of the oil division often sit with it.

It was through this committee that there was recently worked out and sanctioned by the Government a voluntary plan for stabilizing the prices of crude oil. Mr. Requa took the position that further increases in the prices of crude oil would not result in additional production, and that the industry itself should work out the plan of stabilizing. This was done.

Other problems relating to the oil industry—and these problems are vital in winning the war—are being dealt with in the same way. Mr. Requa has frequently said that if the oil industry could not successfully and effectively regulate itself in accord with the national interest, the Government would, of course, be forced to exercise control of, or as a last resort, actually operate, the industry. But examination of his published utterances shows that from the very beginning his attitude has been, as he reiterated in his Tulsa speech, as follows:

> I shall expect that, in all vexatious problems, disputes and trade adjustments, the industry will endeavor to govern itself and reach a satisfactory agreement either independently as between the parties interested or with the aid of the local committees; failing that, then through the good offices of the national committee, appealing to Washington only as the last resort after all the above suggested means of settlement have been exhausted. Centralization of control in Washington as to the details of the industry is hopeless if we are to have the greatest efficiency and exertion of the maximum effort.

The sound common sense in the above quotations from Mr. Requa's utterances, together with the fact that these utterances have been actually embodied in the policy of the Government toward the oil industry, is one of the gratifying episodes of the war. The point to observe is that this is neither unrestrained self-regulation nor governmental regulation. It is coöperation and coördination of all the knowledge and wisdom of both sides to a common end. These principles and the experience which has grown out of them seem well worthy of further study as a matter of national statesmanship.

*Editorial in the New York *Sun*, Oct. 10, 1918.

Quicksilver in First Half of 1918

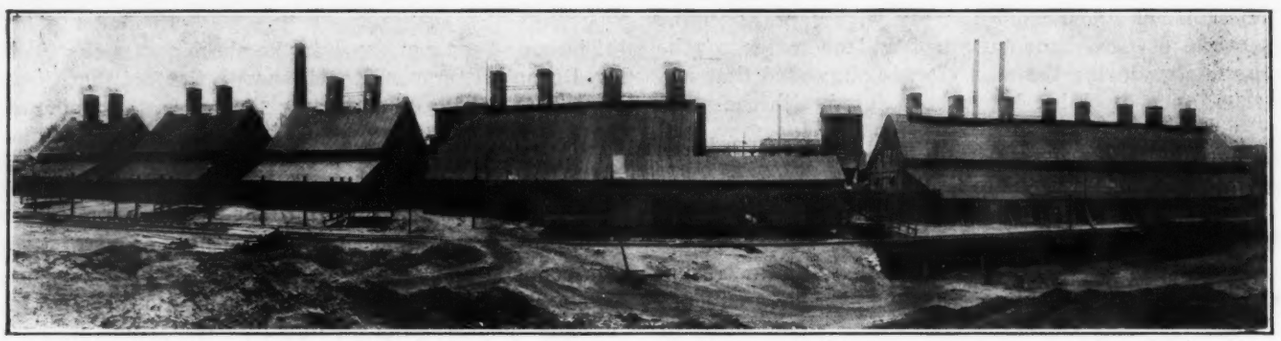
The production of quicksilver in the United States during the first half of 1918 was 17,576 flasks, according to F. L. Ransome, of the U. S. Geological Survey. The total production in 1917 was 35,954 flasks, so that the quantity thus far produced this year falls short by 401 flasks of that which should have been produced to equal last year's output. As quicksilver is a metal for which it would be exceedingly difficult to find satisfactory substitutes in all of its uses, and as an output of 36,000 flasks would, it is estimated, be barely enough to meet the demands in this country in 1918, the shortage indicated calls for energetic efforts by producers, consumers, and the Government to increase the supply and to curtail less essential uses. The demand is likely to be greater in 1919 than in 1918, and the perfection of satisfactory detonators for high explosives that shall contain little or no mercury is one of the urgent problems of chemistry as applied to war.

The decline in production during the first half of 1918 was due chiefly to shortage and increased cost of labor and to exhaustion or depletion of known orebodies under the stimulus of high prices. The practice at some of the larger mines has been to postpone underground exploration and development. On the other hand, the high price of quicksilver has not led as extensively as had been hoped to the reopening of old mines long idle, although there are some notable examples of this result, and, during the second half of the year, these reopened mines may make good the shortage.

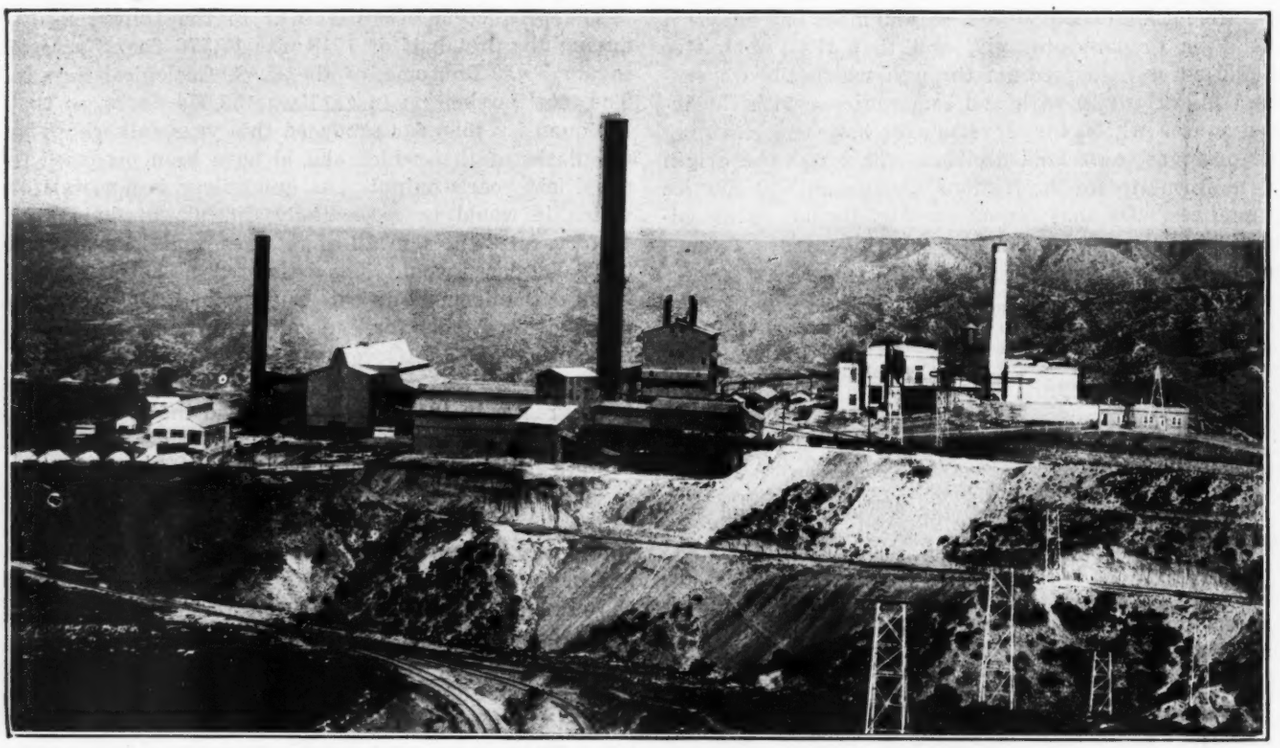
One of the achievements in the industry during the year has been the successful adaptation of the rotary cement kiln to quicksilver metallurgy. Eight of these furnaces are now or will soon be in operation in California, and are expected to make an increase in production that may more than offset the falling off during the first half of the year.

The miners in the Fairbanks district of Alaska intend to make use of the new experiment station. This is indicated by the fact that large numbers of mineral specimens are being sent to the station for examination. Miners within a radius of 200 miles of Fairbanks are bringing in specimens, it is reported.

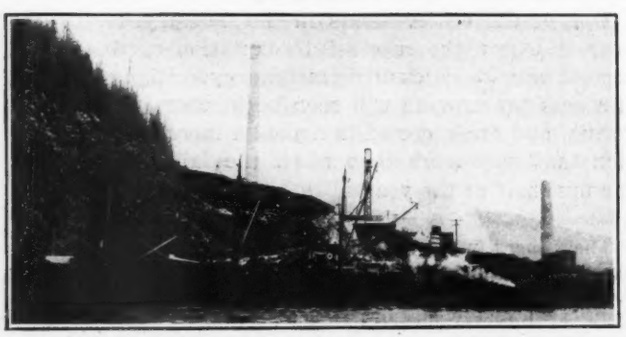
Photographs From the Field

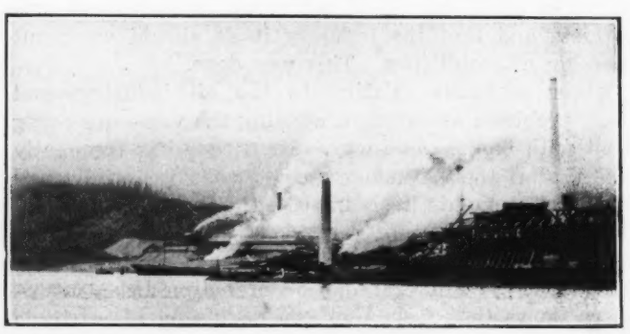


THE GLENDALE WORKS OF THE EDGAR ZINC CO., RECENTLY SHUT DOWN AFTER OPERATION FOR 49 YEARS

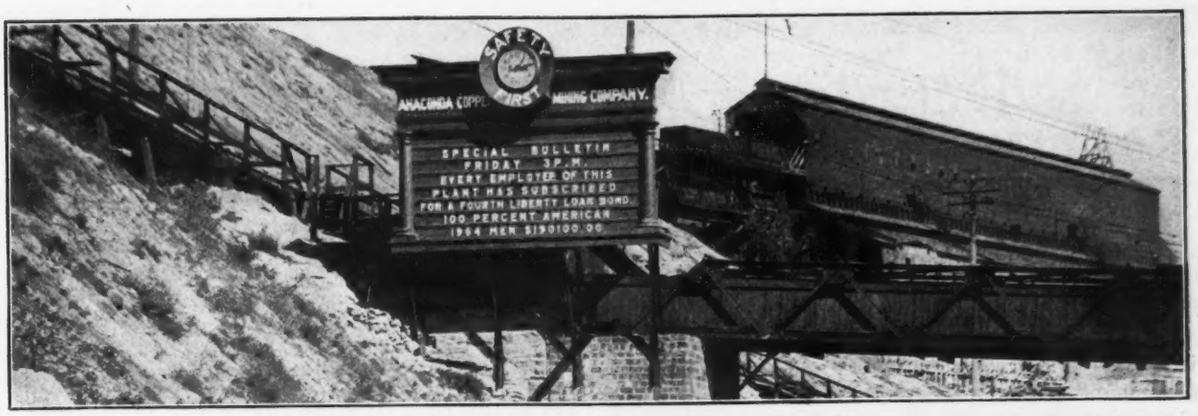


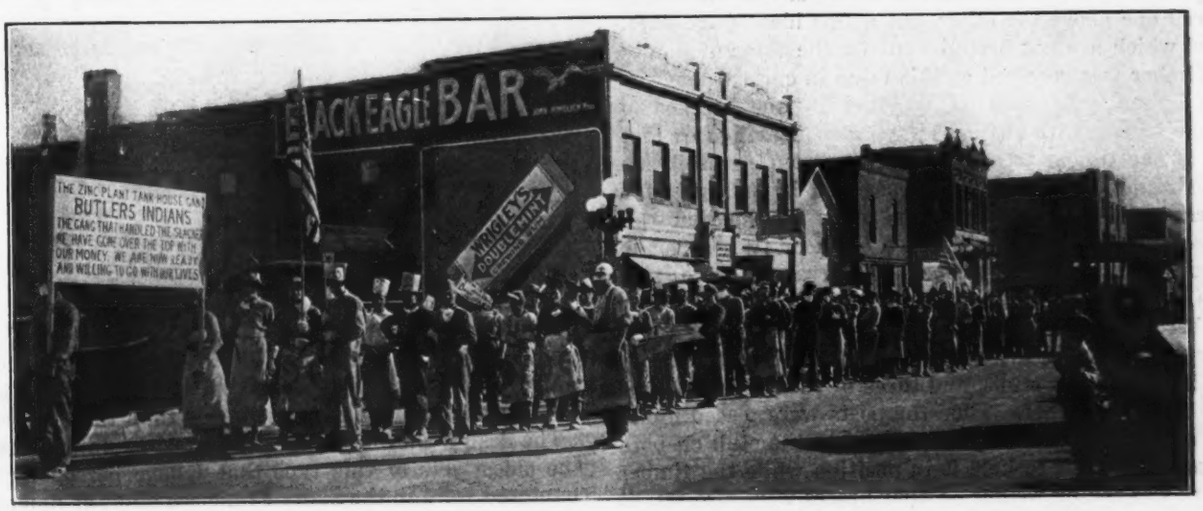
INTERNATIONAL SMELTING CO.'S SMELTERY AT MIAMI, ARIZONA





NEW COKE PLANT AND BYPRODUCTS BUILDINGS OF GRANBY CONSOLIDATED M. S. & P. CO., ANYOX, B. C.




BLACK EAGLE BAR
THE ZINC PLANT TANK HOUSE GANG
BUTLERS INDIANS
THE GANG THAT HANDLED THE SLACKERS
WE HAVE COME OVER THE TOP WITH
OUR MONEY. WE ARE NOW READY
AND WILLING TO GO WITH OUR LIVES
WRIGLEY'S
DOUBLEMINT

GREAT FALLS PLANT OF ANACONDA COPPER MINING CO. "POURS OVER THE TOP" IN THE FOURTH LIBERTY LOAN DRIVE

Details of Practical Mining

A Reënforced Drift Set

BY JAMES E. HARDING*

The crushing of drift sets under stopes was one of the worst difficulties encountered in a certain mine at which I was employed a few years ago. Owing to the large amount of loose ore above the sets, they could not be taken out and replaced, so the only recourse left was to double them up. The final result was a solid set drift, and even this would not hold, making it necessary frequently to abandon a drift long before it was desirable to do so. To correct this condition the set

FIG. 1. DRIFT SET STRENGTHENED BY AN INITIAL BOW OBTAINED WHILE THE TIMBER IS SEASONING

illustrated in Fig. 1 was developed to replace that of Fig. 2. The new set consisted principally of three caps placed one above the other, but a few ideas were developed which are not brought out by the sketch.

Timber was received at this mine in carload lots, and was green. As soon as received it was stacked in single layers, with the ends supported, leaving the middle of the timber to sag as much as possible as it seasoned, and this sagging was assisted by piling a few pieces across the middle of the pile. By the time this seasoning had progressed for a week or two, a sag of about 3 in. in 10 ft. developed. The reason for desiring this sag will appear later. When a drift was being timbered, hitches were cut for the blocks in the usual way, but the caps, instead of being framed, were merely cut and put in as stulls, and three of them were blocked one above the other. Then the posts were placed under the stulls, with a 2-in. plank spiked to the stull on both sides of the post to hold it in position while the timber above was taking weight. Collar braces were also set, so that no freedom of movement was allowed the post. Care was exercised to place these stulls with the bowed side up, thus forming a solid timber arch and adding greatly to the strength of the members. By using these stulls for caps, one piece of timber served where three had been used before, namely, the cap and two blocks, and at the same time the strength of the set was materially increased..

It was interesting to observe the action of these sets as they took weight. The lower stull naturally showed greater effects of the weight. The posts were forced into this stull sometimes as much as 5 in. before the stull broke, and then the weight was taken up by the others in such a way that they showed only slight signs of weight and in no case did the second or third stull break. It was never necessary to replace or reënforce any of these sets.

At first glance the sets look expensive, and they are. On an average they require 68% more timber than those formerly employed and they cost about 20% more to install. In the end, they proved much more economical, for the reason that they never had to be replaced. The final advantage of this method over that formerly used was that there was a difference in cost of

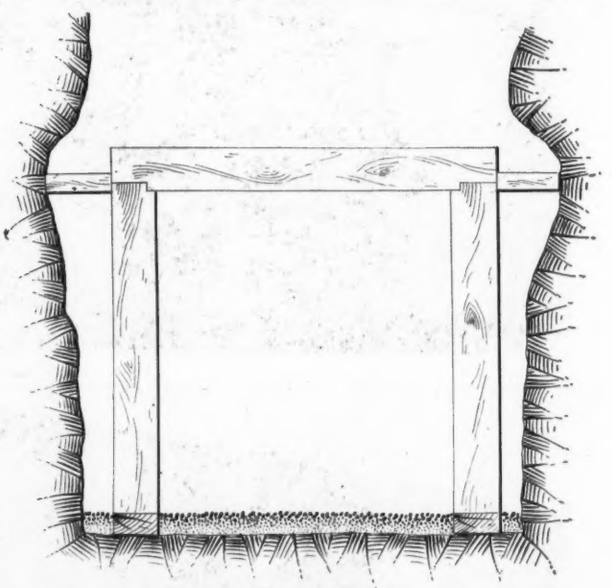


FIG. 2. THE OLD, UNSCIENTIFIC AND POORLY PROPORTIONED DRIFT SET

76% per foot of drift in favor of the new method. No account is taken of the greater convenience or of the greater strength. Although the difference in strength cannot be definitely known, I am of the opinion that the new is about five times stronger than the old.

The design shown in Fig. 2 is as old as mining itself. The oldest sets of this type that I have personally encountered were in the Santa Francisca mine, at Asientos, Aguas Calientes, Mexico, and these were placed, as nearly as could be determined, in about the year 1585. If

*With American Smelting and Refining Co., Casilla 49 D. Santiago, Chile.

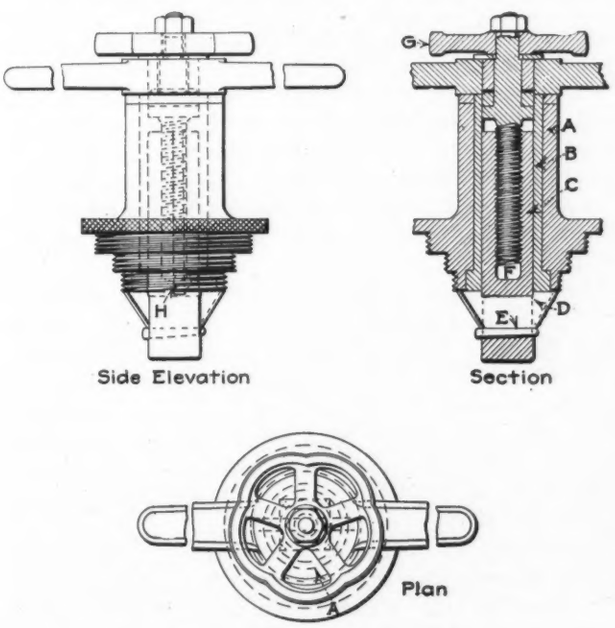
a small amount of theoretical mechanics is applied to this design, its folly immediately becomes evident. The strength of the posts is about 10 times that of the cap.

I carefully refrain from making any comment on the blocking shown in this sketch, which happens to be a representation of a set used at present in one of the largest mines in the world. On a recent visit to that mine, I saw about 1000 ft. of drift, which had been timbered with such sets, entirely collapsed. These drifts are now being retimbered by the same method at a cost of approximately $500,000. The cost per foot is rather high, and it is hard to understand the reason for following a method which has proved a failure. However, in mining, as in many other industries, there seems to be either a lack of initiative or a great desire to follow precedent.

Valve-Reseating Device

BY CHARLES HARBOTTLE*

A valve-reseating device which was designed to reclaim a number of old globe valves and which should be found generally useful is illustrated in the cut presented herewith. Its operation may be described as follows: The sleeve *B* revolves in the body *A*, and the spindle *C* slides in *B*, and is splined from the cutter *D* to the upper end. The sleeve *B* has a driving key *H*, which carries the cutter. The spindle *C*, with the cutter *D*, is raised or lowered by the screw *F*, actuated by the wheel *G*. The cutter is gibbed to fit the spindle, and is held



VALVE-RESEATING DEVICE

in place by the key *E*. The body *A* is threaded to fit three consecutive sizes of valves; the one shown handles 2, 1½, and 1¼ in. A separate cutter is required for each size of valve.

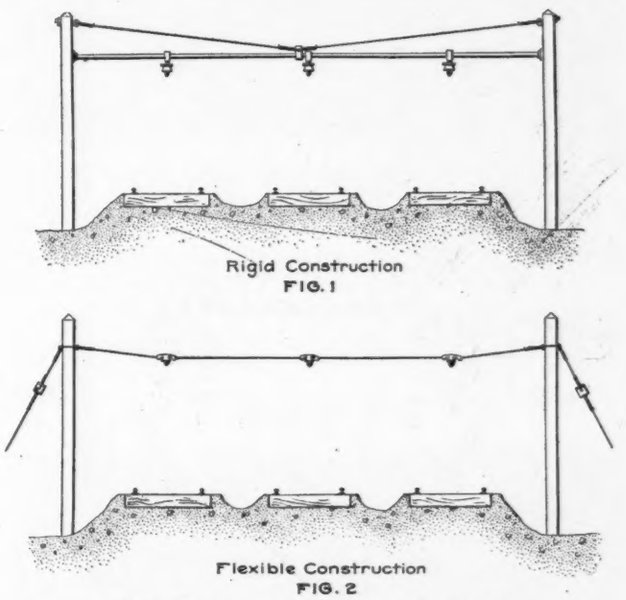
To use the device the valve bonnet is unscrewed and removed, and the reseater screwed into its place. The cutter is fed by the wheel *G* and revolved by the handle until a sufficient cut is made. The valve need not be removed from the pipe line.

A minor drawback to the device is that it will fit valves of only one particular brand, i.e., those which have the bonnet threaded to one standard range of sizes. The cost of making the reseater is small, however; and, in these days of high prices for new valves, the device is paid for when one valve of each size is reclaimed.

Flexible Trolley Construction*

BY G. H. BOLUS

The more flexible or yielding overhead trolley construction is made, the longer will be the life of the trolley wire and wheels that operate on it. There are some conditions under which it is not feasible to install the trolley from flexible supports. Inside mines it is most convenient and economical to attach the trolley to insulated hangers fastened rigidly to the roof or overhead timbers. Also, lack of headroom in the mine often



TROLLEY DESIGN FOR MINE WORK

prevents the use of flexible construction. Outside the mine, there are no such limitations as underground, and it will usually be found that considerable saving can be effected by suspending the trolley from flexible cross-span wire. The common practice of continuing outside the same rigid construction that is used inside the mine shortens the life of wire and wheels and requires an unnecessary amount of material. Great lengths of pipe have been used, some spanning four or five tracks, and quite low, in an endeavor to make the overhead rigid.

Fig. 1 shows an installation of the rigid type. Hangers are secured to cross pipes spaced about 30 ft. apart. There is a great weight of material to hold up in the air. A better construction for such a condition is shown in Fig. 2. Light ⅜-in. soft steel cross-span wires take the place of the heavy pipes; hangers are snapped into the strand without cutting, and the whole line is flexible, thus insuring maximum life of wheel and wire. At 1800 lb. trolley tension, which is good practice, a 4-0 hard-drawn trolley wire supported every 30 ft. sags only about ½ inch.

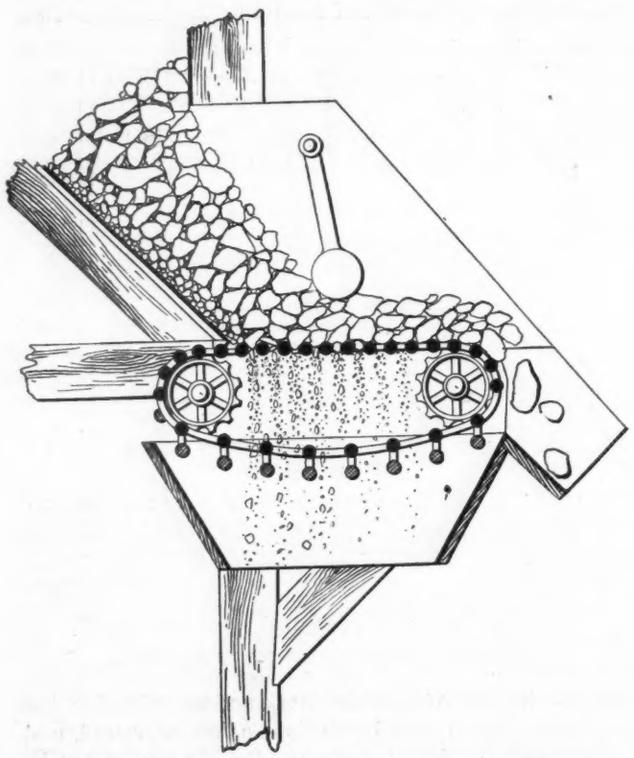
*Master mechanic, Chiksan Mining Co., Chiksan, Chosen.

*Abstracted from O-B Bulletin.

Mining and Metallurgical Machinery

The Ross Automatic Drop-Bar Grizzly Feeders

An automatic grizzly has recently been placed on the market by the Ross Engineering Co., of Montreal, Canada, and is fully described in the company's Bulletin R. 100. Two types are made—the rotary and the traveling bar. Mechanically, both types operate on the same principle. The traveling-bar type as shown in



ROSS AUTOMATIC DROP-BAR GRIZZLY FEEDER

the accompanying illustration comprises a grizzly conveyor consisting of round bars, the width being somewhat greater than that of the chute gate. The bars are set parallel to the chute lip, each end being set in link chains traveling conveyor-belt fashion over sprockets at each end. The grizzly bars are arranged in pairs, one bar only of each pair being fastened to the chains. By this arrangement the free bar in each pair rests in a crotch of the chain when traveling with the load along the upper portion of the grizzly conveyor, and the interval between bars is spaced for the maximum undersize desired.

Upon passing over the sprockets at the discharge end, the loose bars of each pair successively drop downward by gravity, thereby doubling the interval between bars in the under or return side of the grizzly belt and permitting any pieces which may have been lodged between the bars to become released.

The rotary type of grizzly is similar in principle, and consists merely of a horizontal cylindrical-bar arrangement, somewhat greater in diameter than the sprockets in the traveling type. The latter is suitable where a long conveyance of the ore is desirable, and the former where immediate discharge of the oversize is required.

In order properly to control the feed, a swinging gate consisting of three sections, as shown in the illustration, is suspended at the chute opening. The special features that are claimed for this type of grizzly are (1) self-feeding at a uniform rate; (2) rapid elimination of fines; (3) efficient disposal of lumps; (4) no choking—complete discharge of wedged pieces; (5) minimum wear; (6) simplicity of construction; (7) minimum headroom requirements. This mechanism is designed to take the place of grizzlies at mines or mills. The self-feeding feature and the decrease of headroom required are the chief apparent advantages.

"Stack Gun" for Cleaning Chimneys

In many industrial plants the smoke or kiln stacks become clogged with soot. It is necessary, in order to maintain draft, that they be frequently cleaned. A simple, economical and efficient method to accomplish this is to "shoot" the stack with the "stack gun" and FFF (du Pont) blasting powder. This gun can be used in cleaning either lined or unlined brick or steel stacks without possibility of injury to either the stack or the lining.

The gun can be made of an old piece of shafting about 4 in. in diameter and 14 to 16 in. long. Bore a hole 1¾ in. in diameter and 10 in. long in the center of the piece. Then bore a small horizontal hole ¼ in. diameter through the piece to the bottom of the center bore. This hole serves as a touch hole for inserting the fuse. The gun can then be mounted on a pedestal about 6 in. in diameter, so that it will stand in an upright position.

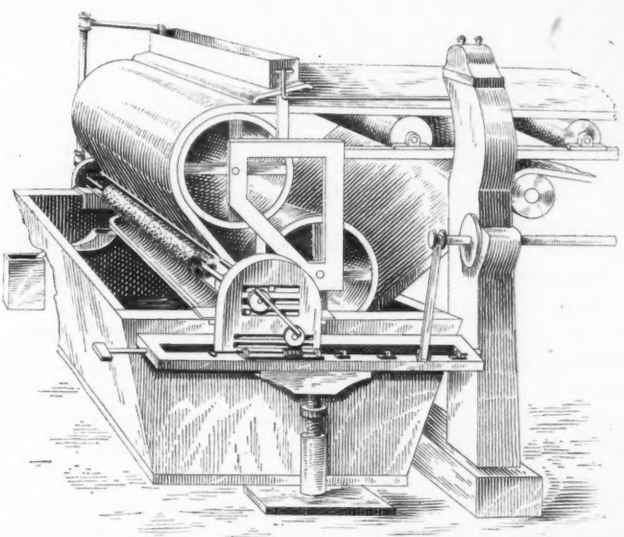
The method of operation is as follows: Pour FFF blasting powder into the mouth of the cannon to about 2 in. from the top. Tamp to the collar with dry clay. A short piece of fuse is inserted in the touch hole and in contact with the main powder charge. Open the flue door at the bottom of the stack, set the cannon on the bottom and in the center of the stack, light the fuse and close the flue door. The explosion shakes and loosens the soot adhering to the sides, causing it to fall to the bottom. It can then be removed through the flue opening.

A cylinder of 8 x 1¾ in. of FFF powder is sufficient for a stack as high as 100 ft. and 4 ft. in diameter, or over. The number of shots necessary to clean a stack thoroughly depends upon its condition. Ordinarily three or four are sufficient, but if very dirty

it may require more. The size of the charge and length of the cannon may be regulated to suit the height and diameter of the stack.

Vanner Belt Cleaner

A device known as the Croesus Saver, and designed for the purpose of effectively cleansing the vanner belt of deposited mineral, has been patented and placed on the market by the Croesus Co., of Salt Lake City, Utah. It consists of a brush in contact with the face of the vanner belt, and placed at a point in the water box where the belt will sag against it, and between the two rollers at the discharge end. Below is a padded roller, which revolves in the same direction as the brush, but in the opposite direction to the belt. An iron spool is fastened to the power shaft of the vanner, and from there a belt



CLEANING DEVICE FOR VANNER BELT

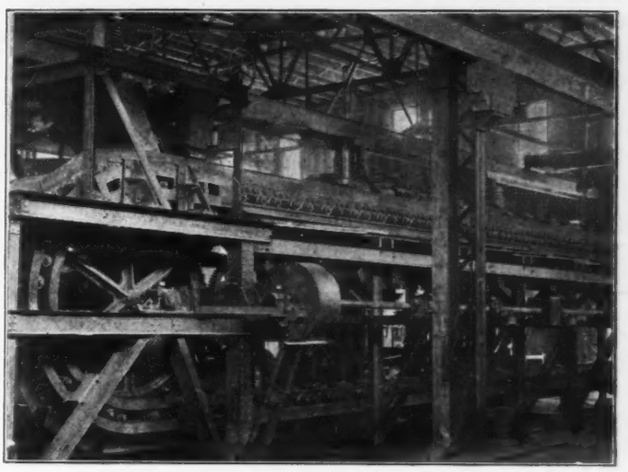
connects with a small countershaft. This operates a worm gear connected with the shaft of the padded roller, to which the necessary movement is given, and precise adjustments are possible by means of suitable adjustable screws and rods.

Adhering concentrate is brushed off the belt in the first instance, and then the surface is rubbed with the padded roller. The concentrate recovered is delivered by sprays to a suitable trough. It is said that the use of the apparatus results in closer concentration and higher recovery of mineral, owing to the cleanness of the belt and the saving of material usually unavoidably lost with the tailings.

Improved D. & L. Sintering Machine

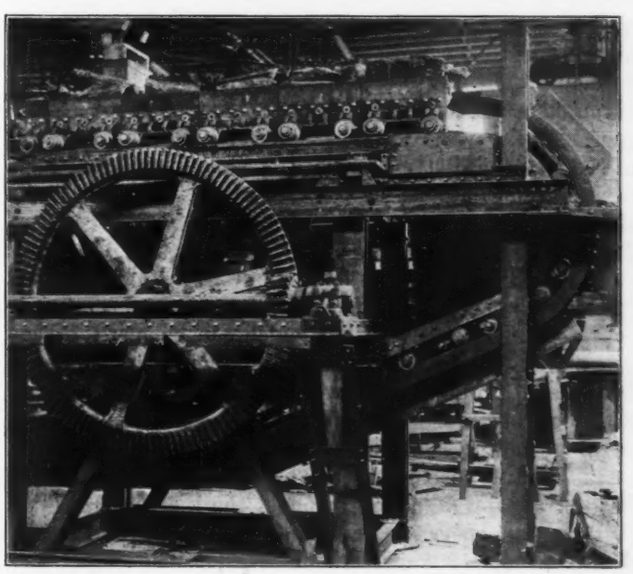
An improved type of Dwight & Lloyd sintering machine recently manufactured for the Carnegie Steel Co., of Newcastle, Penn., and containing several new and distinctive features, is shown in the accompanying illustrations. The model has an effective grate area of 42 in. by 57 ft. 4 in., and it is estimated that its capacity on various materials will be as follows: Flue dust, from 300 to 350 tons of sinter per 24 hours; pyrite cinder, from 375 to 450 tons of sinter per 24 hours; magnetic concentrate, from 450 to 550 tons of sinter per 24 hours.

Among the new features may be mentioned the adoption of seal bars on the pallets, which insure an airtight joint between the latter and the top of the wind boxes. The returning pallets are driven along the lower track by sprocket wheels, instead of returning by gravity,



GENERAL VIEW, IMPROVED DWIGHT & LLOYD SINTERING MACHINE

as in the standard type of machine. The driving wheel is equipped with a shearing pin which automatically prevents an overload to the driving motor, which might arise from an accident with the machine. The weight of the pallet is carried on wheels running on rails; and there is capacity for a month's supply of



DISCHARGE END, IMPROVED SINTERING MACHINE

grease for lubrication. Tooth depressions are cast in the drive, and the sprocket wheel engages with these and not against the pallet wheels themselves, as in the standard model. Sprocket-wheel teeth and gears are all cast in steel and are suitably housed. The sprocket-wheel teeth are removable, so that repairs may be effected with the minimum of dismantling.

Events and Economics of the War

The refusal of President Wilson to consider peace with Germany under the present circumstances allayed the fears of many lest the enemy be allowed to gain any military advantage through an armistice, such as had been suggested to Washington. Berlin's reply to the first note of the President, professing to accept the conditions laid down by him as necessary to secure a permanent peace, was widely looked upon as German trickery. The unrepentant German attitude was again amply expressed in the shelling of the lifeboats of the freighter "Ticonderoga" after torpedoing the vessel.

The retirement of the Germans on the Western front was hastened in the last few days by the wedge driven by Haig in their lines between Cambrai and St. Quentin; Le Cateau, 15 miles east of Cambrai, was taken in this drive, the latter town having previously been captured. Laon and La Fère, the last strongholds of the Hindenburg line, were evacuated by the enemy. Roulers, in Belgium, was captured by the Allies and over 10,000 prisoners taken in this move on the Belgian coast. In the Balkans, the Entente forces have taken Nish, the capital of Serbia, thus cutting the Orient road from Berlin to Constantinople. The loss of the U. S. transport "Otranto" by collision off the Irish coast was reported, 372 men being missing.

Taxing Oil Profits

The convention of the Independent Oil Men's Association, held in New York from Oct. 8 to 11, was attended by more than 300 operators of independent oil plants throughout the country. Among those who addressed the members was Henry L. Doherty, who is a member of the National Petroleum War Service Committee. The excess-profits provisions of the present War-Revenue Act and of the tax measure pending were discussed by Mr. Doherty, in so far as they affect the oil industry.

"The fundamental idea of this bill," Mr. Doherty said, "is that all earnings in excess of 8% are abnormal and represent an excessive profit which can be justly taxed. The normal condition in the oil-production business is losses and profits which would be abnormal in other kinds of business. Again, the bill assumes that all earnings in excess of the pre-war period are due to the war. This is not the case. The sale price of crude oil has not advanced enough to offset the increased cost of drilling and operating, and many of the present producing properties represent discoveries made since the date of the pre-war period specified in the bill.

"It is proposed to tax gasoline 2c. a gallon on the plea that the commodity is a luxury," Mr. Doherty continued. "I dispute the claim that gasoline can be regarded as a luxury. The fact is that very little gasoline is used for pleasure purposes—not over 15% of the total production."

The difficulty experienced by operators in obtaining supplies was reflected in the remarks of M. J. Freeman, who described the extent to which concrete oil tanks had superseded steel tanks since the war started. He said that more than 100 such tanks, with 18,000,000 gal. capacity, had been built in the United States.

Unequal hazards in business as related to taxation were the subject of recent comment in Washington. The man trying to develop an oil well is taking a larger chance than the man who buys at market price a $100 share interest in the National City Bank of New York. The Kitchin bill puts each on the same basis, and under the Kitchin idea of excess-profits tax each should receive an exemption of 8% on the original cost of the enterprise before excess tax applies.

Secretary McAdoo, and all his tax advisors, suggested to Congress that the owner of the bank and the owner of the possible oil well were in a different class, and should not be taxed on the same basis, but that a sliding scale of exemption ranging from 8% to 12% should be established.

Daylight Saving May Continue

The Daylight-Saving Law would remain in effect until rescinded by Congress under a bill passed on Oct. 10 by the Senate. The measure, which was indorsed by Bernard M. Baruch, chairman of the War Industries Board, in the interest of fuel economy, is now being considered by the House. Under the present law the clocks would be turned back an hour on Oct. 27.

The acute shortage of power in many large centers, especially in the East, has led Mr. Baruch to support the proposed change. In a letter to the press he says:

> Some time ago it was brought to our attention that the continuance of the Daylight-Saving Law through the winter months from Oct. 26 until April next would reduce the load required of the power stations at the time of their peaks by a considerable amount, and thus really place at the disposal of these power service companies a considerable amount of power.
>
> At the request of the Power Section, J. W. Lief, chairman of the national committee on gas and electric service, made inquiry of 20 of the largest power producers in the country as to the result of the continuance of the Daylight-Saving Law upon their peak load. With one exception, in Pittsburgh, Penn., the universal reply has been that such action would reduce the peak load required of them between 10 and 15 per cent.
>
> It is difficult to estimate from these comparatively few replies the total effect upon the whole country, but the following figures may be of value in connection therewith:
>
> It is estimated that there is installed in the central station of the United States at the present time approximately 10,000,000 kw. capacity of power. If the replies received are at all indicative of the situation throughout the country that it would reduce their peak load approximately 10%, this would mean that the saving would make 1,000,000 kw. capacity available. This figure, however, has to be much modified from the fact that there are a great many power stations where the power capacity is not short, and that there are others where their limiting capacity is dependent not upon the peak load but upon their total output in kilowatt hours, but we believe it can be conservatively stated that at least 25%, or 250,000 kw., would be made available by continuation of the Daylight-Saving Law.

The advantage of the proposed change may be seen in the record of power consumption of Detroit, Mich., according to Alex Dow, president of the Detroit Edison Co. That city has used Eastern time in place of Central time since 1915, although it is in the Central time zone. The change is advocated as one of immediate relief.

More Oil Available in Great Britain

In Great Britain, it is possible to produce 400,000 tons of crude oil per year by retorting material that can be secured if the government will lend assistance. This is the belief of a committee of petroleum technologists, who have recently studied the production of oil from cannel coal and similar materials. Over 10,000 tons of the raw material can be collected per day, in the opinion of the committee, which, at an average yield of 30 gal. per ton, is equivalent to the stated 400,000 tons of crude oil per year. The yield per ton, obtained in testing various processes on the material available, ranged from 15 to 80 gal. By using the proper type of retort for the raw material employed, a wide range of the latter can be utilized.

Would Check Fuel-Oil Wastage

Fuel sufficient to operate the railroads for one month is wasted every year by users of fuel oil. Five times the fuel necessary for the Government, including the Army and Navy, is thrown away. These are the conclusions of experts of the Bureau of Mines, who have been coöperating with the Fuel Administration in a survey of the use of fuel oil for power purposes.

Last year 160,000,000 bbl. of fuel oil was used and 40,000,000, or one-fourth, might have been saved by more intelligent operation of plants and by proper firing. This represents a useless expenditure of $140,000,000, or enough to pay some of the important war bills, the oil selling at about $3.50 per bbl. This wastage is doubly criminal at this time, because of urgent need for naval and other essential war purposes. The 40,000,000 bbl. lost each year is equivalent to 10,000,000 tons of coal

The Bureau of Mines and the Fuel Administration have sent into those parts of the country where oil is extensively used a number of engineers to demonstrate where losses occur and how they may be stopped. Van. H. Manning, director of the Bureau, has ordered that a copy of these instructions be forwarded to all mines known to be using fuel oil.

Labor Unrest in South Africa

The strike movement in South Africa by natives employed at the mines and elsewhere has remained without result so far, according to the *Ironmonger* of Sept. 14. Seventy-one of the ringleaders have been put under arrest. The men demand a raise of 1s. a day. The situation is said to be well in hand. General Botha, who has a great influence over the natives, has issued an appeal through loyal chiefs and has summoned them to an "Indaba" (conference). A few "International" white agitators, who are alleged to have incited the natives by leaflets and other propaganda, have been laid by the heels.

There is much discontent at the increased cost of living. The Consolidated Trade Unionists' Federation is said to be formulating a demand for a rise in wages for all mechanics on the mines to a standard of £8 2s. for a 48-hour week, set up by municipal engineers recently. Handy men employed on other than skilled work in mechanical departments are to be paid not less than 75% of the standard rates for mechanics, and others in proportion. The Federation has also demanded that all colored drill sharpeners shall be dismissed, failing which, after a month's notice its members will refuse to cooperate with them. The above demands, coupled with the shortage of colored labor, will adversely affect many low-grade mines.

New Metal Company in Brazil

By decree of Aug. 7, 1918, the President of Brazil authorized the American Steel Co.'s Brazilian corporation to operate in that country, according to a consular report. This is a branch of the American Steel Export Co., of New York. The objects of the company are the manufacture of iron, steel, manganese, copper and other metals and their alloys, the purchase and sale of metal products, and the purchase and exploitation of mines and timber lands of all kinds. The capital stock of the company's branch is $20,000, divided into 200 shares of $100 each.

Spain To Control Potash Output

The *Gaceta de Madrid* of July 28 contained the text of a law dated July 24, 1918, according to Consul Ely E. Palmer, at Madrid, whereby the Spanish government assumes supervisory control of all national mining concessions already granted or to be granted, producing potash salts and other substances entering into the manufacture of fertilizers. Work in such mines will be under the supervision of the mining inspector of the district in which the concessions are situated.

To survey and exploit the already discovered sources of potash in the provinces of Barcelona and Lerida owned by the government, an appropriation of 80,000 pesetas ($15,296 at 5.23) has been authorized by the law above referred to. Whenever the total national production of potash salts reaches 50,000 tons or more per year, a special office will be created to regulate such production, and the quantities and proportion to be produced by each mine will be determined by the office in question, and work in such mines cannot be diminished or stopped without the assent of the mining inspector of the district.

Among the war uses for antimony is an antimony-lead alloy, carrying 12 to 13% of antimony, employed in the manufacture of shrapnel bullets, says a statement issued by the U. S. Geological Survey. Smaller quantities of liquated antimony sulphide are used in the primers of shells. For the last-named purpose it is claimed that the material must carry less than 2% of impurities insoluble in hydrochloric acid. Antimony sulphide, as a powder, is used in the charge of some shells to produce, on explosion, a dense white smoke, which is of service in range finding.

Franklin K. Lane, Secretary of the Interior, says: "Germany has thought and still thinks, no doubt, that she has a whip hand over America because of her supply of potash, but America can in two years become entirely independent of Germany by development of her own deposits and use of processes devised by Dr. Cottrell, of this department."

Industrial News from Washington

BY PAUL WOOTON, SPECIAL CORRESPONDENT

Depletion in Iron Mines

John R. Vanderlip, of Minneapolis, during the hearings on the Revenue Bill, pointed out to the Senate Committee on Finance that a distinction exists in the matter of depletion in the iron mines of the Lake Superior region. Mr. Vanderlip represented the iron-ore interests from whose properties 80% of the iron ore produced in the United States is taken. An extract from his remarks before the committee is as follows:

The particular point in respect of depletion to which I should like to direct attention is this: In the Lake Superior region at least —and I cannot speak for other regions—almost all of the iron ore is disposed of under what are called mining leases. By the terms of those leases the lessee agrees to pay a specified price per ton for all the ore that he mines. He is further obligated, whether he mines or not, to pay to the owner of the property an annual mimimum sum, being the royalty rate on an agreed number of tons —perhaps a hundred thousand tons. And that is paid whether he mines or not, and after it is paid he is entitled to take out the number of tons of ore for which he has so paid without making any further compensation.

Under the existing law, the act of Sept. 8, 1916, it is provided in general terms—I am not quoting exactly—that the owners of mines shall have the right to deplete to the extent of the value in the mine of the ore which is mined and sold in the taxable year. That does very well where the lessee is mining and taking out his ore; but in those years when he does not mine and take out the ore and pays advance royalties, under the construction that has been put on that law by the Commissioner of Internal Revenue, the owner of the iron property is not permitted to take any depletion, and is, on the other hand, required to return all of his royalties received as income and to pay income and excess-profits taxes upon them.

It takes but a moment's consideration to reveal that in those years when the operator takes out ore against the advance royalties that he has already paid in previous years, the mine owner receives no money at all for that ore from which he can make any depletion. That is the general suggestion that I want to make in respect to that, and I desire, therefore, to submit in connection with it a proposed form of a clause for depletion which will protect the iron-mine owners of the Lake Superior district, and, in fact, will protect the owners of all natural resources, whether it be timber, iron, or any other mineral or oils or gas. So much for that.

With respect of the definition of invested capital, I feel that subdivision 2, restricting the value of tangible assets which are paid into a corporaton to the par value of the stock issued therefor, works a great injustice. Prior to 1913, when, for the first time, Congress had authority to levy an income or any other form of tax based upon income, whatever gain there might have been over cost in the value of properties became the capital assets of the owner of those properties, as was distinctly held by the Supreme Court in those recent cases which were decided on May 20 and June 3 last.

There are today thousands of corporations in the United States organized to handle certain properties with practically a nominal capitalization, in return for which properties worth many, many times the par value of the stock were turned in. If this present law be enacted in the form submitted by the Ways and Means Committee, you can see at once the injustice that it will work, and upon that point I think that the definition of invested capital demands some revision.

Mills and Smelteries Added to List

After efforts on the part of the U. S. Bureau of Mines, the War Industries Board has placed on its list of preferred industries smelteries and mills devoted to the treatment of metallic minerals. The smelteries, mills and necessary mines of the non-metallic minerals also have been included, but with the proviso that each plant or mine must establish its individual essentiality and must apply to the War Industries Board for listing. The failure of the first list to include mines and plants producing and handling such non-metallic minerals as pyrites, sulphur and graphite caused protest.

Cuyuna Manganese Estimated

Ore reserves in the manganiferous iron properties of the Cuyuna Range amount to 20,000,000 tons, according to an estimate made by the U. S. Bureau of Mines. Classified according to phosphorous content, the tonnage is divided as shown in the following table:

TONNAGE OF MANGANIFEROUS IRON ORE ON CUYUNA RANGE

	Tons Ore	%Dry Mn	%Nat. Mn	Tons Mn
Class 1, Phosphorus below 0.1%	1,640,000	16.50	14.50	237.500
Class 2, Phosphorus between 0.1 and 0.2%	3,330,000	12.10	10.63	366,300
Class 3, Phosphorus over 0.2%	14,745,000	8.38	7.08	1,040,000
	19,715,000	9.70	8.28	1,643,800

Of Class 1, 160,000 tons, and 1,670,000 tons of Class 2 have more than 20% silica content. Besides these reserves, such mines as the Ferro Algoma, and Cuyuna-Mille Lacs have immense tonnages of highly siliceous, intimately mixed, manganiferous material, containing about 15% manganese and less than 35% silica. "This material," comments one of the Bureau's engineers, "can be made into silicospiegel if it should be deemed advisable to use large quantities of this alloy. The alloy from this material, reduced in an electric furnace, gave the following analysis: Fe, 58%; Mn, 25%, Si, 17%; C, 1%; Al, Ca (?); Mg (?), 1%. The uncertainty of prices, the lack of equipment for electric furnaces, and the unfavorable attitude of most of the furnace men against silicospiegel, stand in the way of producing large quantities of this alloy from material which is found ready to mine, but unmerchantable.

Prior to the conference on Oct. 15 between representatives of the zinc producers and of the zinc smelters, the earnest hope was expressed in Washington that an agreement be reached. It was regarded as far more desirable to all concerned that the matter be adjusted so as to avoid fixing prices on zinc concentrates and on smelter tolls. It was feared that if an agreement was not reached, the general dissatisfaction among the miners would force such action.

It is reported that the War Industries Board has called the attention of the U. S. Bureau of Mines to the differences arising in certain districts between the shipper and purchaser of ores on questions of sampling and analysis and has suggested that the Bureau might render some help to the producer in this matter. So far as can be ascertained, no action has been taken on this request, but it is known that at least some of the Bureau officials believe that it is reasonable that the miner should be protected by the Government through the establishment of a uniform and correct standard of sampling and assaying.

Monthly Copper Production for 1918

The table which appears herewith is compiled from reports received from the respective companies (except in the cases noted as estimated), together with the reports of the U. S. Department of Commerce as to imported material, and in the main represents the crude-copper content of blister copper, in pounds.

The grand total includes, under "Imports in ore and blister copper," the production of such companies as Canada Copper, Granby, Cananea, Braden, Cerro de Pasco and Chile. As a matter of record, however, the individual figures are given after the total. We also report the production of the Boleo, Backus & Johnston and Kantanga companies, whose copper does not come to the United States.

MONTHLY CRUDE COPPER PRODUCTION, 1918

	June	July	August	September
Alaska shipments	3,980,197	3,994,204	4,245,557	4,216,816
Arizona:				
Arizona Copper	3,700,000	4,000,000	4,300,000	4,330,000
Cons. Ariz. Smelting	1,750,000	1,430,000	1,250,000	1,200,000
Inspiration	10,300,000	9,000,000	9,000,000	7,800,000
Magma	947,128	800,000	900,000	747,805
Miami	4,692,554	4,793,082	5,374,198	5,012,865
New Cornelia (*a*)	2,822,000	2,300,000	2,838,000	2,468,000
Old Dominion	3,368,000	2,533,000	2,064,500	2,292,000
Ray	7,736,559	7,300,000	6,625,000	7,250,000
Shannon	672,000	794,225	708,000	.....
Shattuck Arizona	805,310	672,024	682,861	686,844
Other Arizona	25,823,920	24,727,751	26,363,078	25,002,934
California:				
Mammoth	1,196,000	1,330,000	1,320,000	1,140,000
Michigan:				
Calumet & Hecla	11,699,212	11,118,426	10,718,520	10,341,468
Other Lake Superior (*b*)	7,000,000	7,000,000	7,000,000	7,000,000
Montana:				
Anaconda	25,800,000	25,400,000	24,900,000	21,800,000
East Butte	1,999,760	2,076,460	1,714,358	2,134,700
Nevada:				
Mason Valley	1,224,485	1,190,177	1,032,702	1,682,340
Nevada Cons	7,250,000	6,400,000	6,500,000	6,670,415
New Mexico:				
Chino	6,706,474	6,310,396	5,065,818	7,936,000
Utah:				
Utah Copper	18,500,000	16,021,766	19,920,947	17,785,000
Eastern smelters (*b*)	1,750,000	1,750,000	1,750,000	.....
Total reported	149,723,599	140,941,511(*c*)	144,273,539	.....
Others, estimated	17,000,000	17,350,000	16,650,000	.....
Total United States	166,723,599	158,291,511	160,923,539	.....
Imports: Ore and concentrates, etc	11,624,275	12,898,436	18,546,115	.....
Imports in blister, etc	13,801,332	19,543,854	42,519,271	.....
Grand total	192,149,206	190,733,801	221,988,925	.....
British Columbia:				
Canada Copper Corpn	244,586	232,647	159,821	.....
Granby Cons	3,438,521	2,167,077	2,820,207	3,371,535
Mexico:				
Boleo	1,322,720	1,697,360	.....	.....
Cananea	4,100,000	5,000,000	5,000,000	4,900,000
Other Foreign:				
Braden	8,292,000	7,036,000	6,690,000	6,020,000
Cerro de Pasco	5,874,000	5,238,000	5,786,000	6,150,000
Chile	9,280,000	7,556,000	8,496,000	.....
Katanga	3,505,315	4,894,200	4,894,200	.....
Backus & Johnston	2,096,727	1,324,823	.....	.....

(*a*) Only electrolytic cathodes are entered. New Cornelia also produces some copper from ores sent to Calumet & Arizona smeltery, which is included under "Other Arizona." (*b*) Estimated. (*c*) Does not include United Verde Extension, whose figures are not yet available.

The production of the United States by months since the beginning of the year is as follows:

	Pounds
January	165,431,568
February	160,011,364
March	185,525,168
April	163,207,096
May	181,070,350
June	166,723,599
July	158,291,511
August	160,923,539

The item "Alaska shipments" gives the official figure of the U. S. Department of Commerce. Kennecott production for June, July, August and September was 4,044,000, 5.090,000, 5,280,000, and 5.508,000 lb. respectively.

Labor's Best Friend

Accidentally our eye fell upon an editorial that appeared in the July issue of the *Wage Earner*, the official organ of the Workingman's Club of Massachusetts. We did not see the original, but noticed the reprint of it. It seems to us to express very sensible opinions:

There is one industrial truth which the workingman has got to learn to appreciate.

Of course there are a great many of this kind of truths, but no matter how important they may be, the one we are writing about is the most important.

The labor union, the political club, the fraternal association, all have their places in the industrial world, and each organization plays an important part in the matters which come under its jurisdiction.

There is one thing, however, which is away above all others, and that thing is for the workingman to find out who is his best friend.

The business agent of your union will claim that he and our fellow members are your best friends; the political leader, who got you or your relative a job, will say that he is your best friend, and the president of the fraternal order will prove to you that the fraternal brothers, who call on you when you are sick, attend your funeral when you die, and help pay the expenses—that these are your best friends.

All may be your dear friends, your good friends, and may be willing to put their individual hand into the individual pocket and chip in a dollar or so to help you out, and this is real friendship.

But let us tell you one thing, that the best friend the workingman has got is the man who goes out, week after week, and digs up the money for the payroll.

Yes, sir, it is your old boss who is your best friend. His pride is in his business, and to keep his business going he has got to pay his help, and many a business man has gone into an early grave, unsuccessfully trying to be the "best friend" of his workmen, the man who dug up their payroll every week, until it killed him.

Your business agent may tell you, and you may believe, that the small boss, the big boss, the small contractor, the big corporation, are all taking advantage of you, and this may be true, but as long as you keep working for them, and they keep putting over the pay envelope to you every week, they are your best friends.

If you do not get all in your envelope that you are entitled to, if you work longer hours than you believe you ought to for your money, and matters of kindred nature, all are open for your discussion, but while you discuss, the man who pays you off is your best friend.

If you strike, you expect your union to be your best friend, and help you live by paying your something every week. If your union did not support you in this way, where would you find the "best friend" who would pay your bills?

The workingman must not forget at this time, when he is able to make his best friend pay him more and more and more, that he is working his best friend to the limit, and even the best of friendships becomes strained when money matters are injected and too much is requested.

The least that you and your representatives can do, in enforcing demands, is to do so in a friendly way, in a decent way, in a way which will not line up every "best friend" in the country against our unions.

Organized labor will never be able to gain any more than organized capital in the end, and with organized labor and organized capital working together, all at the same time, to get the most they can out of the people of the United States, there will be three big factors fighting, and the fittest will survive.

Capital and labor are powerful, but the third factor, the citizenship of the United States, is greater than they, individually or combined, and it ill behooves labor to become opposed by the general public because of the assumption, on the part of labor, of the same prerogatives in the past claimed by organized capital, namely, to the powerful belong the spoils.

We believe it good tactics to remember, at all times, who really is the best friend of the workingman.

The Consolidated Interstate-Callahan Mining Co. reports that, in the second quarter of 1918, 23,215 tons of zinc- and lead-silver ores was mined. The mill and flotation plant treated 38,802 tons, with an average content of 16.19% zinc, 4.40% lead and 1.5 oz. silver per ton; and produced and shipped 11,781,177 lb. zinc, 1,438,396 lb. lead, and 27,218 oz. silver. The total cost of mining and milling was $7.35 per ton.

Notice to Lead Purchasers

The announcement of the Lead Producers' Committee for War Service, which was quoted on the market page of the last issue of the *Journal*, is reprinted herewith, together with a reproduction of the card that has been sent out with the notice. The text of the notice follows:

The Lead Producers' Committee for War Service is now allotting and clearing all carload shipments of virgin lead, both domestic and bonded, refined and antimonial.

In order to distribute most equitably the supply of lead after provision has been made for United States Government orders,

NAME OF COMPANY ____ CHIEF USE (GIVE ONE ONLY)

LEAD PRODUCERS' COMMITTEE FOR WAR SERVICE,
61 BROADWAY, NEW YORK.

WE HEREBY CERTIFY THAT OUR TOTAL PURCHASES OF LEAD (EXCLUSIVE OF THAT WE HAVE RESOLD IN CARLOAD LOTS) FOR THE YEARS INDICATED, WERE AS FOLLOWS

YEAR	VIRGIN PIG LEAD SHORT TONS	SEVEN-EIGHTHS OF ANTIMONIAL LEAD SHORT TONS	REMELTED LEAD AND LEAD CONTENT OF SCRAP, DROSS, ETC. SHORT TONS	LEAVE THIS COLUMN BLANK
1915				
1916				
1917				
TOTAL 3 YEARS				
AVERAGE (LEAVE BLANK) MO.				
AVERAGE (LEAVE BLANK) YR.				

DATE ____ SIGNED ____

the Lead Producers' Committee for War Service seeks the information requested on the enclosed card relative to your purchases for the years 1915, 1916 and 1917.

Below is a list of "chief uses" of lead. You are asked to name one only in the place provided on the card for that purpose. In case your chief use does not appear in the below list, kindly state briefly what it is.

TABLE OF CHIEF USES OF LEAD

Batteries	Foil	Retail sales
Brass	Locomotives	Shrapnel
Bullets and shot	Mixed metals	Sheets, pipes, bends.
Car seals	Paints and colors	Steel mills
Cable	Railroad equipment —other than locomotives	

You are urged to immediately fill in and return the card.

The notice is signed by Clinton H. Crane, chairman of the committee. Attached to it is a sticker on which the purchaser is asked to apply as a test to all transactions a query, namely, "to what extent, if at all, will the sale of this lead contribute directly or indirectly toward winning the war; and, if at all, how urgent is the need?"

September Pig-Iron Production

Pig-iron production during September reached a new high record, 113,942 gross tons per day, or a total of 3,418,270 gross tons, according to *Iron Age*. This exceeds the former high mark of pig-iron production—113,189 tons daily in October, 1916—by 753 tons, and the August output of 109,341 gross tons by 4601 tons daily. Ferroalloys produced in September amounted to 66,275 gross tons, creating another record, and surpassing the former of 54,633 tons in May, 1918, by more than 21%. For the first nine months of this year, 28,231,415 gross tons of pig iron was made, as compared with 28,794,231 tons in the same period in 1917, and 29,041,045 tons similarly in 1916. Fourteen furnaces were blown out and seven put in blast, giving 365 active on Oct. 1, as compared with 372 on Sept. 1. The estimated capacity in blast on Oct. 1 is 114,570 gross tons, as against 112,390 tons on September 1.

"Bunker Bullion"

The Bunker Hill & Sullivan Mining and Concentrating Co. has begun the publication of an interesting little paper with the title "Bunker Bullion," of which C. L. Larson is editor. John Rock, R. S. Handy and A. D. Moir also are on the staff. It is intended to have it serve as a medium through which those who remain at home may keep in touch with the men who are serving in the Army or Navy, by sending messages of good cheer, hope, and gratitude, as well as news of what is being done to back up those "over there." The first issue gives the names of 256 of the company's employees who are in the service, and contains greetings from the manager of the company, the Mayor of Kellogg, and the chairman of the Red Cross branch, as well as some figures of the response to campaigns for the Liberty loans, the Red Cross, and other organizations.

Export of Copper From Australia

SYDNEY, N. S. W., CORRESPONDENCE

The copper producers in Australia are in an awkward position. The amount shipped to England at present is almost nil, because all available space is taken up with other exports having precedence of copper. Up to June 30 last the position was excellent. Those connected with the selling of the whole Australian output had been able to arrange with the Imperial Munitions Department that the latter would accept delivery at any Australian port, and pay for the copper at a fixed price, f.o.b., thus relieving the producer from any anxiety as to shipping space. This arrangement has not, so far, been renewed, or at least there has been no public announcement of any such renewal. More than 10,000 tons of munitions copper in Australia, in the form of metal that has been paid for, is awaiting shipment.

Since June 30 the output of copper has been maintained at the normal rate of about 3000 or 3300 tons monthly from all Australia, but the metal has not been sold to the Imperial Munitions Department and is still lying at the ports. Naturally, before it can be shipped, the above-mentioned 10,000 or more tons must be first disposed of. Meanwhile the cost of making the current 3000 tons monthly must be met by the producers, an expenditure amounting to over £70 per ton for most of it, and £100 per ton for the remainder. The banks cannot help to an effective extent in aiding the producers, because their resources are fully taken up with financing those who are interested in wool, lead and other products having precedence on copper—in addition to aiding the flotation of the sixth and seventh war loans.

Producers feel no little anxiety as to the disposal of current copper outputs. The Metal Trust, that has done so well in the past for the Australian metal producers, is fully alive to the situation. Shipment of the accumulation of munitions copper is being arranged for, and about 3000 tons is soon to be dispatched. Mr. Hughes and his colleagues in London are working hard to relieve the situation. Meanwhile it is possible that the two chief customs works—Port Kembla and Wallaroo—may have to cease buying customs ores temporarily. Small producers who are not under contract with these works must consider themselves fortunate

in having obtained payment during the last few months at the rate of £80 per ton, with further payments deferred to a time when the price is again fixed, usual smelting deductions and bank interest being charged in the meantime. So far, none of the seven chief producers has had to decrease output, and the next couple of months will decide whether they can continue at normal rates or must shut down.

Since the receipt of the above from our Australian correspondent, the following additional information as to the copper situation in Australia, bearing date Sept. 16, has come to hand:

The anxious position in which Australian copper producers were placed during July and August has now been relieved. The Australian authorities in London have succeeded in obtaining a renewal of the contract for Australian copper with the Imperial government. The published terms are £106, f.o.b. Australia, and the period is until the end of 1918. Though this relieves the copper mines from financing their product, it does not make shipping space any more plentiful, and before the copper made in the period from July to December, 1918, can be shipped, that made in the first half of the year must be cleared.

Between the delivery of blister at Port Kembla works and handing it over as electro to the local Imperial agents, about 60 days elapse. This means that blister made on and after Nov. 1 next will not be delivered as electro till after the end of 1918. Such electro or furnace-refined copper as is delivered after the end of 1918 must be disposed of under a fresh contract. Considering the small total quantity of Australian copper and the difficulties of transport to England, as compared with American copper, the obtaining of a fresh contract on f.o.b. terms must be considered as a piece of good fortune to Australian producers, due mainly to the efforts of their London representatives.

Special Mining Industry Committee For the Liberty Loan

New subscriptions for the Fourth Liberty Loan placed through the special Mining Industry Committee of the New York Federal Reserve District up to and including Oct. 15 are given in the accompanying list, which, with the amount previously reported, shows a total of $38,885,300.

Cerro de Pasco Copper Corporation	$500,000
First National Copper Co	100,000
Consolidated Arizona Smelting Co	50,000
Homestake Mining Co	100,000
Charles T. Carnahan	2,000
Walter H. Aldridge	30,000
James F. Kemp	2,600
Employees, Albert R. Ledoux (additional)	9,000
Utah Consolidated Mining Co	100,000
The Dorr Co	15,000
North American Refining Co	2,500
Franz Fohr	1,000
R. H. Martin Co	5,000
Horn Silver Mines Co	10,000
Charles W. Welch	1,000
Schaaf-Regelmann, E. O	20,000
General Mineral Co., Inc	2,500
Anonymous subscriptions	1,045,000
Anaconda Copper Mining Co	3,050,000
United Verde Extension Mining Co	500,000
Magma Copper Co	135,000
New Mines Issues Co	50,000
New Process Mining Co	20,000
Superior Arizona Copper Co	25,000
Mason Valley Mines Co	110,000
American Zinc, Lead and Smelting Co	150,000
Argonaut Consolidated Mining Co	50,000
Lucius Pitkin, Inc	3,750
Charles L. Peabody	2,000
Thomas H. Leggett	2,500
H. J. Greutert Co	1,500
Nipissing Mines Co	250,000
Butte & Superior Mining Co. (additional)	500,000
Chino Copper Co. (additional)	1,000,000
Ray Consolidated Copper Co. (additional)	1,000,000
Nevada Consolidated Copper Co. (additional)	1,000,000
Utah Copper Co. (additional)	2,000,000
George Lewis & Co	1,000
F. Howald	10,000
William Young Westervelt	7,500
Sydney H. Ball	1,000
Shattuck Arizona Copper Co	62,500
Employees, New Jersey Zinc Co. (additional)	39,800
Julius Goldman	115,000
Kuno B. Heberlein	1,000
Rowland W. Cox (additional)	3,000
Alfred W. Dodd	1,000
North Star Mines Co	10,000
Yukon Alaska Trust (additional)	50,000
E. N. Breitung & Co	25,000
Poillon Poirrier	10,000
Hamilton M. Brush	1,050
H. W. York	2,000
North Butte Mining Co	60,000
Minerals Separation Co	500,000
National Zinc Co	15,000
Employees, National Zinc Co	20,000
Charles E. Herrmann	1,250
Adolph Lewisohn & Sons (additional)	300,000
Matthiessen & Hegeler Zinc Co	100,000
Percy G. Beckett	5,000
Unity Gold Mines Co	5,000
Tobias Wolfson	10,000
American Vanadium Co	1,000,000
E. P. Earle	125,000
L. A. Chapin	1,200
Robert M. Raymond	7,500
Phelps Dodge Corporation	800,000
Cleveland H. Dodge (additional)	250,000
William Earl Dodge	50,000
James McLean (additional)	250,000
Arthur C. James (additional)	250,000
St. Joseph Lead Co	785,000
Clarence C. Burger	7,000
Elko Prince Mining Co	64,150
George Notman (additional)	25,000
R. V. Dey	10,000
J. V. N. Dorr	10,000
Subscriptions of less than $1000 each	6,200

Gold and Silver Production in 1917

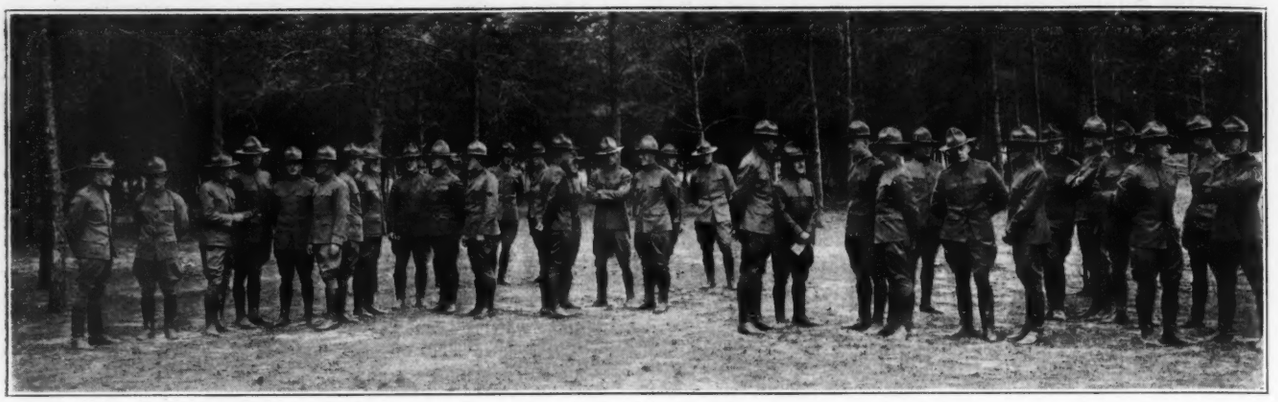
The corrected and revised statement of gold and silver production in the United States in the calendar year 1917, prepared jointly by the Bureau of the Mint and the Geological Survey, has just been issued and shows that the preliminary estimates made in January were too high.

GOLD AND SILVER PRODUCTION OF THE UNITED STATES

(Gold, Value; Silver, Fine Ounces)

	Gold		Silver	
	1916	1917	1916	1917
Alabama	$7,400	$2,200	.....	.....
Alaska	16,124,800	14,671,400	1,266,317	1,207,164
Arizona	4,092,800	5,180,600	6,680,252	6,962,257
California	21,980,400	20,929,400	1,936,910	2,107,107
Colorado	19,185,000	15,974,500	7,551,761	7,291,495
Georgia	20,400	6,500	.....	.....
Idaho	1,058,300	754,800	11,570,399	11,402,542
Illinois	.....	.....	5,782	7,116
Maryland	.....	.....	153	538
Michigan	.....	.....	759,068	684,225
Missouri	.....	300	128,860	63,344
Montana	4,328,400	3,673,200	14,046,054	14,555,034
Nevada	9,064,700	6,932,500	13,682,067	11,217,654
New Hampshire	.....	.....	935	.....
New Mexico	1,350,000	1,085,400	1,729,917	1,535,807
North Carolina	23,000	10,800	1,738	590
Oklahoma	.....	.....	606	.....
Oregon	1,901,500	1,687,300	221,887	172,152
South Carolina	300	1,700	.....	.....
South Dakota	7,471,700	7,372,900	210,100	190,382
Tennessee	5,700	5,500	93,837	106,975
Texas	500	100	664,319	587,945
Utah	3,859,000	3,522,100	13,545,802	13,360,905
Vermont	300	100	1,964	403
Virginia	500	1,300	508	4,500
Washington	580,600	488,200	294,516	266,112
Wyoming	20,200	3,700	3,407	3,400
Continental U. S.	$91,075,500	$82,304,500	74,397,159	71,727,647
Philippines	1,514,200	1,446,100	17,643	12,715
Porto Rico	600	100	.....	.....
Total	$92,590,300	$83,750,700	74,414,802	71,740,362

The revised figures give the total production of gold in 1917 at 4,051,440 oz., or $83,740,700 in value, or less than the January estimate by $705,900. The output of silver was 71,740,362 oz. fine, which is 2,504,128 oz. less than the preliminary figures.



GROUP OF OFFICERS OF THE TWENTY-SEVENTH ENGINEERS

Word From the Front

News of the mining regiment is always welcome, the more so now because of its scarceness. All mining men are interested in what the boys of the 27th Engineers are doing. The following letter was lately received from an officer in the regiment:

Our hardships are many and our life at the front has not been over-described, but the worst hardships in the men's eyes are not those that you would expect. They take for granted the rain, the mud, the vermin, the long hikes, the occasional shortages of food, the constant subjection to bombardment and gas; the occasional casualties. The one thing, or things, that they are always seeking is tobacco, sweets and magazines. These seem petty wants, but are undoubtedly what we crave.

The Comfort Fund of the 27th Engineers is a really fine thing, and has already made a name for itself here. Company C is at present detached from the regiment and attachment to the ——; they are doing combat engineering work, are constantly under fire, have had their share of casualties, and have been highly praised by high officers. They are all volunteers, a splendid bunch of miners and men, and deserve all that can be done for them.

The Comfort Fund is used as the name indicates, and more than once has enabled us to provide for the men in a tight place.

Friends are assured that their contributions are still wanted for the Comfort Fund. Possibly some have mistaken the total reported weekly on this page to be the amount on hand in the treasury. This, of course, is not the case, and the balance is steadily dwindling. Mining men may well take pleasure in helping the mining regiment through "a tight place." A check now will accomplish this end.

HOW THE COMFORT FUND STANDS

Previously acknowledged	$18,492.77
C. M. Eye	10.00
C. A. Burdick	5.00
Mining and Metals Sections, National Safety Council	125.00
Total	$18,632.77

Make your checks payable to W. R. Ingalls, treasurer of the Association of the 27th Engineers.

Captain Irving

The *Yale Alumni Weekly* gives the following new and interesting information:

MR. C. W. MENDELL.
Director Yale Bureau,
American University Union,
8 Rue de Richelieu, Paris.

Aug. 2, 1918.

My Dear Sir:

In reply to your letter of July 31, would say that the burial of Capt. John D. Irving, Engineer R. C., took place on Tuesday, July 23, 1918. The escort left the American hospital at Langres at 3 p.m. and proceeded to the American section of the Langres cemetery, just north of town. A military band led off, playing the funeral march, followed in order by Company A, 27th U. S. Engineers, which formed the escort, then the remains supported on a gun carriage and draped with the national colors, and finally a number of allied officers attending the funeral. The honorary pallbearers were Col. P. S. Bond, Commandant, Army Engineer School; Col. F. B. Wilby, Lieut. Col. J. W. Schultz, Maj. J. G. B. Lampert, Maj. Evarts Tracy, and Maj. Brooks, all of the Engineer Department.

The burial service was conducted by Dr. C. W. Lowrie, pastor of the Presbyterian church, Detroit, Mich., who is now serving as a chaplain of the Y. M. C. A. In the course of a most excellent address Dr. Lowrie made a number of well-chosen remarks upon the value and importance of the work on which Captain Irving was engaged, upon the important results already attained by him, and upon the great loss to the service that his death occasioned. The Army Engineer School can most heartily concur in all of the above, as Captain Irving was one of our most valuable officers, and his place will be most difficult to fill.

At the conclusion of the service, Company A fired three volleys over the grave and a trumpeter sounded taps beside it. There were a number of flowers presented by Captain Irving's friends.

All of Captain Irving's effects have been secured and disposed of according to orders and regulations, the grave is properly marked and identified, and it is therefore believed that there is nothing that you could possibly accomplish by coming to Langres.

Yours truly, W. H. HOLCOMBE,
Major, Corps of Engineers,
Assistant Commandant.

Copper Mining in Ontario Unprofitable

As a result of high mining costs and increased freight rates and smelter charges, copper mining has become unprofitable in the province, states an Ontario Bureau of Mines report. The only recent shipper was the Hudson Copper Co., at Havilah. Nickel-copper mining and smelting, however, show an increase in output. The Canadian Copper Co. is no longer known by that name, having been absorbed by the International Nickel Co. of Canada, Ltd. The new refinery of the company, at Port Colborne, began operations in July. From the Creighton mine, ore is being raised at the rate of over 100,000 tons per month. During the half year, 804,640 tons of ore was raised from the operating nickel-copper mines. Ore smelted was 717,119 tons, producing 40,178 tons of nickel-copper matte.

The Butte and Superior Mining Co. reports that, in the second quarter of 1918, 114,716 tons of ore was milled, of an average grade of 16.242% zinc and 6.154 oz. silver per ton. The concentrates produced amounted to 32,653 tons, containing 51.882% zinc and 19.763 oz. silver per ton. The total cost of mining and milling amounted to $9.9088 per ton. Ore milled during the quarter was 21,161 tons less than during the first three months of the year. This was due to shortage of labor, and as the result of a serious wreck in No. 1 shaft, occasioned by the fall of a loaded skip from the surface to the 1200 ft. level, which cut away a considerable part of the shaft timbering between the 1000 and 1200-ft. levels.

Editorials

The President's Messages

THE President in his replies to the German proposals for peace has said exactly what every American has wanted him to say. He has the unqualified backing of the American people. If in the first message—the interrogatory message—the critical found what they thought were omissions of things that ought to have been said, they learned later that the President in his superior wisdom had omitted them simply owing to the time for them not yet having come.

The second message—the real reply to the German appeal—breathed the spirit of unconditional surrender and the immediate cessation of the atrocities that are horrifying the civilized world. The President says in effect: Discontinue your outrages, evacuate the countries that you have invaded, arrange an armistice with the military commander of the Allied armies that will be satisfactory to him, and then, and not until then, we will talk about paece.

This is equivalent to a demand for unconditional surrender, and there is every indication that Germany is ready to yield to the inevitable. Bulgaria is already out of it. Turkey is prostrate. Austria-Hungary is manifestly on the point of breaking into pieces. The military supremacy of the Allied armies over the German on the Western front is unquestioned. This state of affairs has developed without Germany beginning to feel the full measure of America's mechanical power.

With President Wilson and his advisers acting in collaboration with the governments of the Allied nations, we may rely upon the brushing away of any German trickery. The President is expressing the voice of the American people, and every citizen stands with him in the intention of not relaxing one ounce of effort until unconditional surrender is enforced.

Zinc in the Third Quarter, 1918

THE zinc statistics for the third quarter of 1918, in comparison with those for the previous quarters, are given in the accompanying table. The figures do not reveal any great industrial changes. The market during the third quarter averaged a little better than in the second, which induced the firing of some idle furnaces, with the result of an increase of about 4500 tons in the production of distilled spelter. The production of electrolytic spelter, which is governed by independent factors, showed proportionately a large increase.

The total number of retorts in distillers' works decreased from 196,580 at the end of the second quarter to 173,944 at the end of the third. This was due to the dismantling of some large plants. We are carrying on our list some other plants that probably will be abandoned.

The number of retorts in use at the end of the second quarter was 110,956. At the end of the third it was 118,008, of which 3556 were in use for redistilling. Only three companies reported such use. The contraction in the margin between the prices of high grade and common spelter naturally reduced that business.

The position of stocks at the end of the quarters showed little change, as to the aggregate. We include in our enumeration of stocks all that is in smelters' hands, irrespective of whether they intend to use it in accessory factories of their own, or not. The technical position may indeed be considered to have been improved. However, the ability of smelters to increase their production and the easiness of the situation in high-grade spelter were counteracting factors, and therefore the advance in the market during the quarter did not go far.

Production in short tons:	First Quarter	Second Quarter	Third Quarter
Distilled	125,572	117,512	122,130
Electrolytic	8,096	9,404	11,124
Total	133,668	126,916	133,254
Stock at end of quarters:			
At works	(a)	43,149	42,854
Elsewhere	(a)	2,932	2,934
Total	64,443	46,081	45,788
Total number of retorts	198,894	196,580	173,944
Number of retorts in use	124,072	110,956	118,008

(a) Not segregated in reports.

The reported stocks as of Apr. 1, July 1, and Oct. 1, respectively, include only what was in producers' hands, either at their works or held elsewhere.

Electrochemistry and the War

THE achievements of electrochemistry are manifold, and its products multiform. This science has grown in usefulness at a phenomenal rate. It forms the basis of innumerable and important industrial enterprises, and it works hand in hand with many other industries which profit by its help. It has increased and enlarged the market for many old standard mining and metallurgical products, and has invaded new fields, and with its magic touch has created demands for products that formerly were of limited interest and usefulness.

The importance of electrochemistry in all departments of usefulness may easily appear to be unlimited when we contemplate its nearly vital service in that one most spectacular of all fields for the moment—the battlefield. The electric furnace or the electrolytic cell has played its part in the production of almost every important substance or contrivance used in modern warfare.

Of all the steel produced in the United States, it is estimated that 60% is now applied to war work. In the manufacture of high-grade steel the electric furnace is rapidly supplanting the crucible. The largest manufacturers of axles and bearings for automobiles are using electric furnaces to make their steel. Electric steel is increasing in production and gaining in popularity.

One naturally thinks of ferroalloys and electric furnaces at the same time. Ferromanganese is now pro-

duced in considerable quantity in the electric furnace. Its use in steel manufacturing is too well known to require comment. Ferrotungsten, ferrovanadium, ferromolybdenum, and ferrotitanium, are used in the production of modern guns, high-speed cutting tools, and in many kinds of machinery. Ferrochromium is an essential in armor plate and armor-piercing projectiles. Ferrosilicon is used to deoxidize steel, and is an important constituent in the manufacture of shell steel.

All fine machine work requires the use of abrasives. Carborundum and alundum are machine-shop necessities. Carborundum is essential in the manufacture of machine guns, rifles, shells, automobile trucks, airplanes, and all machine work. Alundum, aloxite, and exolon are artificial emeries of wide usefulness. All these abrasives, and others, are electric-furnace products. In the manufacture of carborundum the raw materials which enter the furnace are coke and sand. Alundum, aloxite, and exolon are made from bauxite. Alundum has found considerable use as a refractory. It is also used by the chemist for filters in analytical work.

Electrolytic copper refining has become a vast industry. Copper is a metal of wide application in war equipment. Its uses in brass and for wire are common. No satisfactory substitute has been found for the copper bands on shells. Electrolytic zinc has taken rank in the high-grade class. Aluminum, made in the electric furnace from bauxite, is most important in the manufacture of airplanes, automobiles, and auto trucks.

Calcium carbide is made in the electric furnace, the raw materials being coke and limestone. Calcium carbide naturally suggests acetylene and the oxy-acetylene torch, and it is the raw material in the manufacture of cyanamid, which in turn suggests ammonia, nitric acid, and acetone, the last named important in the manufacture of certain explosives. Cyanamid is also a valued intermediate agent in the fixation of atmospheric nitrogen.

From common salt the electrolytic cell makes caustic alkali and chlorine gas, and bleaching powders, disinfectants, peroxides, and sodium metal, the latter being used in incendiary bombs, are produced as byproducts. The gases used for war purposes include oxygen, hydrogen, chlorine and bromine, all produced electrolytically.

Among the materials used in explosives are caustic potash, caustic soda, sodium chlorate, potassium chlorate, nitric acid, and other nitrogen compounds. These are commonly products of the electric furnace or cell. Other substances of similar method of production are phosphorus, used in matches and incendiary bombs; magnesium, employed in making alloys of great strength and light weight, to be used, in turn, in the manufacture of aircraft; magnesium, a constituent in devices to illuminate battlefields at night; graphite, used as a lubricant; and carbon bisulphide, a valuable solvent, made from the raw materials charcoal and sulphur. The carbon and graphite electrodes with which all electric furnaces are equipped are themselves electric-furnace products.

Electrochemistry is not just coming into its own—it has arrived; and it is proving itself to be a most willing, powerful, and versatile agent in the winning of the war. It has greatly enlarged the field for chemical and metallurgical engineers.

The Gold Question

SOME people talk about the "price for gold" being "fixed," as if that were an arbitrary act of some government, or governments, which can arbitrarily alter the fixation. The value of gold is what it will buy. There is no price for gold and no fixation. Sovereigns and dollars are simply names corresponding to certain quantities of gold. The alteration of those names would not effect anything.

The miner delivers to the mint an ounce of gold, roughly speaking, and receives a coin called the double-eagle, which is marked 20 dollars. With that coin he can buy, say, four tons of coal or the labor of a man for four days. Call the double-eagle, or the coined ounce of gold, 40 dollars, instead of 20, or 40 simoleons, or whatever may be pleased, it will not buy any more coal or labor merely by reason of the changes of name, and if the gold miner cannot buy any more things, he is no better off.

The claim of the gold miner for governmental consideration must rest upon different grounds than any conception that is so naive, and those grounds are substantially these: That our currency has departed from the gold basis, so that gold would really be at a premium if it were free and private owners and producers of gold are deprived of the benefit of a premium by governmental interference. Or, that money is simply a vehicle of commerce, that the gold basis for conducting the greatly expanded commerce of the present time is insufficient, and that the Government can properly contemplate the payment of a bonus merely for the sake of obtaining a further supply of new gold.

BY THE WAY

We recently had an opportunity to peruse a circular issued by the Metal Mine Workers' Industrial Union, which is No. 800 of the I. W. W. This circular, which is an appeal to workers to join that union, is interesting indeed, especially the following:

It is the union that is going to get the pay dirt for the miner. We are starting out with real modest demands. These demands will be multiplied as soon as we have the power to enforce more demands. Among the demands that we want at once are these:

First, a six-hour workday. Down in the hot stopes a decree has gone forth that six instead of eight hours shall be the length of a shift. That decree, backed up as it is by organization, must be complied with.

Second, no less than two men on a machine. This demand is exceptionally modest. Years ago we worked two men to a machine, and today, after 24 years of M. F. M. organization, one man to a machine is the rule. In the drifts and crosscuts we have held our counsel and have decided to abolish that rule. Our decision, backed by real organization, must be the law.

Third, no more speeding up. Too many of our fellow workers are rustling on the hills now. By the curtailing of production we not only will make life more bearable for ourselves, but we will also provide more jobs for the boys rustling on top of the hills.

Fourth, the abolition of the physical examination. We do not propose to be stripped before going to work and then be stripped again when we get our pay check. One of the strippings must be abolished now. We will tend to the other one later.

There are some people who naturally prefer the trade of robbery to working for a living. What's the use of talking about a six-hour day?

Reed Smoot, of the Senate Finance Committee, says the revenue bill will be radically altered before it passes the Senate. The measure as it stands, he claims, is unscientifically framed and tends to restrict production. It provides for $2,000,000,000 more than is needed, and the excess-profits section lacks justification. The bill, he says, is a political measure designed to get money from the smallest possible number of voters. He points out that of $24,000,000,000 estimated war expenditures, $6,000,000,000 are loans to our Allies, so that on a one-third basis $6,000,000,000 would be sufficient to raise by taxation. Even then, he adds, "we can't spend $18,000,000,000 in a year." Senator Smoot advocates consumption taxes on sugar, tea and coffee, estimating the revenue as at least $1,000,000,000. An additional $1,000,000,000 could be realized from a 1% tax on gross sales, he said. Estimates submitted to the House Ways and Means Committee indicated that a 1% tax on gross sales would bring in not less than $2,000,000,000.

The Belgian government has conferred the title of "Honorary Citizen and Friend of the Belgian Nation" on Herbert C. Hoover, the American Food Administrator. The preamble of the decree conferring the honor on Mr. Hoover renders homage to his forceful personality, when he stood at the head of the colossal undertaking for feeding Belgium. It adds that the government would have liked to give him testimony of its admiration and gratitude in the usual form, but owing to the fact that Mr. Hoover is now an American Government official the Belgian government refrained from doing so, in respect for American traditions. "That is why the government," says the announcement, "proposes to the King to reserve for him a place of honor in the Belgian family, over which he has been the agent of Providence, and to affirm in a public official document the unalterable friendship of Belgium to her great benefactor. That purpose is accomplished by conferring upon him the title of honorary citizen and friend of the Belgian nation, which has been borne by nobody since Belgium has existed as a state." The preamble is signed by all the ministers.

Senator Fall, of New Mexico, has some interesting ideas. In the course of the debate on Senator Henderson's bill he expressed himself contemptuously respecting the geologists of the country, using the following language: "Bear in mind that no geologist in the employ of the United States Government or any private corporation, so far as I am aware, ever discovered or developed a lode or body of minerals. We have geologists, but they are not practical miners or mining men, and by the time one of them completed a geological survey where some brogan-shod miner had discovered a deposit, and told you how the particular mineral happened to be deposited, by the time he had arrived at this conclusion and put it down upon paper, to tell how that mineral was deposited, the war would have been over." Oh, Senator Fall! We do not remember any discoveries that have been made by the geologists in Governmental service, but we are sure that the Anaconda Copper Mining Co. would not dispense with its geological department for any consideration. Senator McCumber inquired of Senator Fall if the geologists and the scientists would not be the very people who would be employed under the terms of the bill. Senator Fall replied: "Not if Barney Baruch or Replogle run the business. I say that unhesitatingly, because they are business men. One of them for years has been buying and selling minerals and the other one's business has been that of producing iron and steel economically, and he knows more about that business than any other man in the United States, I presume." We wonder whether the smile is broadest in the environs of Wall Street or in Mr. Baruch's own office.

On one occasion a "sport" of herculean frame, and wearing a huge black beard that gave him a most ferocious appearance, cheated a miner out of $400 or $500 in a game of draw poker, reminisced Dan de Quille in "The Big Bonanza." The miner saw the cheat and left the place wearing an ugly look. Some of those present who knew him told the big sport that he had better leave, as his man had gone off to "heel himself," and there would soon be trouble. "Why, gentlemen," said he, "you don't know me—you don't know who I am! I'm the Wild Boar of Tehama! The click of a six-shooter is music to my ear, and a bowie knife is my looking glass—." Here he happened to look toward the door, and saw the miner entering with a shot gun, and concluded "— but a shot gun lets me out," and he went through the window behind him head first.

The War Labor Board, on which the public and the business interests are represented, is really subordinate to the War Labor Policies Board, headed by Felix Frankfurter. The Policies Board is interdepartmental, supposedly, but it is, in reality, dominated entirely by Mr. Frankfurter, who was born in Vienna, Austria, Nov. 15, 1882, and who was brought by his parents to this country when he was 12 years old. The labor policies outlined by Mr. Frankfurter become, almost automatically, the policies of the Taft-Walsh board, says the *Boston News Bureau.* Mr. Frankfurter has never been employed in any business of his own, and previously had no experience with labor. He graduated from the Harvard law school and has been a professor of law. He was engaged for a long time in municipal research work, and shortly after the war began became a special assistant to the Secretary of War. The policy of the Frankfurter board, of course, is to avoid strikes, and to avoid any impairment of good working conditions. As the policy has been worked out by the War Labor Board, higher rates of wages than were actually asked for have been granted in some instances. The financial ability of a company to pay increased wages is seldom taken into consideration. The eight-hour basic day is being applied everywhere. The Labor Policies Board, in addition to dictating the policy of the War Labor Board, also dictates the policy of the United States employment service, which has already assumed complete control of common labor and partial control of skilled labor. The Railroad Administration has raised the wages of workmen $400,000,000. The Wage Adjustment Board of the Shipping Board has raised wages in the shipyards about $300,000,000. There is no member of the Cabinet of the President who can be regarded in any way as a spokesman for American business.

NEW PUBLICATIONS

Report on the Building and Ornamental Stones of Canada. Vol. V, Province of British Columbia. By Wm. A. Parks. Pp. 236, illus. Canada Department of Mines, Ottawa, Canada.

Gold Dredging in the United States. By Charles Janin. Pp. 226; illus. Bull. 127, U. S. Bureau of Mines Washington, D. C.

An exhaustive monograph on the subject, written with the object of summarizing the facts concerning the development of the gold dredge, describing in detail the essential features of present-day practice, discussing the data needed to determine whether a placer deposit can be profitably dredged, and suggesting approved methods of prospecting placer ground and operating dredges.

The author, a recognized authority on the subject, has handled the matter with conspicuous success; and the present volume—for it is more than a bulletin—will undoubtedly rank among the standard textbooks on this important method of gold recovery. After paying a tribute to New Zealand, as the originator of the first commercially successful gold dredge, Mr. Janin deals with the early history of the process, tracing the development of the industry step by step to the present day, and paying particular attention to the gradual progress in design and construction. The various gold-dredging districts in the United States are described in detail and classified in geographical order. Complete information is given as to the details of operation, and reference is made to practically every phase of the subject. A special chapter on dredge construction, by George E. Sibbett, will be found of considerable value. Details of practical control and many informative tables are given, and a large number of excellent plans and illustrations are included.

According to the author, the highest point of production for the gold-dredging industry has been reached, and a decline in output may be expected. Improved methods, such as those described and advocated by the author, will help in extending the industry beyond what was previously considered the limit. The bulletin will prove of value, as well as interest, to designers and builders of dredges, to mining engineers, and to all others who are connected in any way with or contemplate investing capital in placer-mining ventures.

The Metallurgists and Chemists' Handbook. By Donald M. Liddell. Revised Edition. 4 x 6¾, pp. 656, illus.; $4. McGraw-Hill Book Co., New York.

Captain Liddell, of the Signal Corps, has brought out a new edition of his little handbook, which he prepared in the first place while he was on the editorial staff of the *Journal*. In the new edition there has been no change from the plan originally adopted, and the additions, in the main, have been largely those bearing on war activities, such as additional information on alloys and toxic gases.

It is always difficult satisfactorily to review a handbook, for, as the author of this one says in the preface to his first edition, his friend who checked the page proofs from beginning to end is doubtless the only man besides the author who would ever read the entire book. In fact nobody expects ever to read a handbook from beginning to end, any more than he would a dictionary, unless something like proofreading requires him to do so. A handbook is not intended to be a means for passing a pleasant evening. On the contrary, its function is to serve as a work of reference; something to be kept on the desk or on a nearby shelf, that will be handy in supplying some necessary figure, such as the atomic weight of an element, or the boiling point of a metal. The practical test of a handbook is therefore the resources that such a compendium may be found to afford after prolonged use.

During the last five years there has been a considerable vogue in issuing handbooks. Many authors have sought to emulate in their own fields the classic productions of Trautwine and Kent. Most of these, unfortunately, have failed to grasp the handbook idea at all. What they have produced have been tabloid treatises, rather than handbooks for reference. Both are valuable, but a distinction needs to be made between them.

Captain Liddell is one of the few who appreciated the handbook idea and produced one. His little book is just as much a handbook in its own field as is the production of Trautwine in its larger field, or perhaps we should better say its more general field, for chemistry and metallurgy may be as large a subject as is the whole of civil engineering, and probably is.

The best thing that we can say of Captain Liddell's book is that since the publication of its first edition it has worn well. For the chemist and metallurgist it is a mighty handy thing to have around, for the fundamental figures that are commonly wanted are easily to be found in it, and the author has shown good judgment in selecting his tables and testing their reliability.

Metallurgy of Lead. By H. O. Hofman. 6 x 9, pp. 664, illus.; $6. McGraw-Hill Book Co., New York.

Fortunate is that author who, having once written a famous treatise on his special subject, attains the opportunity, after the lapse of many years, to do it all over again. This is something like the opportunity of living one's life over again. With the riper experience and keener perception of what ought and what ought not to be done, the result is bound to be a great improvement. This is what has happened to Professor Hofman with his "Metallurgy of Lead." His original treatise was published in 1892, since which time it has been revised from time to time. At length, however, it seemed wise to abandon the old book and write a new one. The book that we are now reviewing is a new book. Only two or three chapters of the old one remain.

Let us make haste to say, right away, that the new book is a great production. It is no special praise to say that it will immediately take its place among the classics of metallurgical literature, for the old treatise was already enshrined among them. It is better for us to say that the new book is a great improvement upon the old one. It is very satisfying. There is scarcely anything that the lead smelter will want to know that he cannot find within its pages.

Professor Hofman's new book reminds us, a good deal, of Kerl's "Grundriss der Metallhüttenkunde," that famous work of nearly 40 years ago. It has the same character as a compendium, the same tendency to give figures of costs, the same copious footnotes to references, and the same air of presenting a digest of all printed knowledge on the subject. However, Hofman is in no wise a mere imitator in style. His own individuality is impressed throughout the book, especially his imparting of knowledge that he has obtained by direct communication with the original sources and his reporting of the things that he has seen himself and the researches that he has made himself. His style differs essentially from that of Peters, in the latter's most famous book, in being much less critical of practice and in showing less inclination to pronounce what is best and to condemn what ought not to be done.

Of course the conscientious reviewer must find something to criticize in every book, just to prove that he has read it, if for no other reason. We confess to a little irritation over Professor Hofman's practice in referring to authorities *en bloc*. Thus, in describing the practice at some smeltery, or the theories respecting some process, he will offer a digest of all and make one blanket reference to all, giving the reader no chance to discriminate among good and bad authorities. Moreover, this must be disagreeable to good authorities, who find themselves thus associated with others whom they know to be doubtful. We noticed one case, moreover, where Professor Hofman quite misunderstood an authority whom he quoted, although this fortunately was more or less immaterial. The engravings in the new book are generally excellent, but in numerous cases the presentations could have been improved greatly by the omission of non-essential details.

Personal

Have You Contributed to the Association of the 27th Engineers?

William de L. Benedict is back from California.

Harry J. Wolf examined mining property in southwestern Colorado recently.

Norman Carmichael, of Clifton, Ariz., was at Globe, Ariz., early in October.

Forbes Rickard was in Idaho Springs, Colo., recently on professional business.

Franklin W. Smith has returned to Bisbee, Ariz., from a visit to Parral, Mexico.

C. D. Leslie has been elected president of the South African Institution of Engineers.

Bulkeley Wells investigated mining property in Montana during the latter part of September.

Cecil H. Desch has been appointed professor of metallurgy in the Royal Technical College, Glasgow.

J. B. Tyrrell, of Toronto, has been making a professional trip to the chrome mines at Black Lake, Quebec.

H. S. Meyer has been elected president of the Chemical, Metallurgical and Mining Society of South Africa.

C. W. Greenland, a graduate of Queens University, Kingston, Ont., has been appointed professor of geology there.

A. Gibb Maitland, government geologist for Western Australia, has received a long leave of absence on account of ill health.

Hugh Lee has succeeded **L. K. Fletcher** as superintendent of the Mutual Chemical Co., operating chromite mines in Quebec.

Maj. George B. Wilcox, formerly chief watchman for the Calumet & Arizona Mining Co., is now at Camp Greene, North Carolina.

William S. Dun, lecturer on palaeontology at Sydney University, Australia, has been elected president of the Royal Society of New South Wales.

Stanley C. Sears, of Salt Lake City, has been commissioned a captain of engineers in the United States Army, and ordered to Camp Humphreys, Virginia.

Frank P. Knight and **J. Judson Dean,** president and vice-president of the Iron Cap Copper Co., were visitors recently to the property at Globe, Arizona.

Oscar Lachmund, who recently resigned as general manager of the Canada Copper Corporation, will engage in private consulting work in Spokane, Washington.

Henry Bruere, vice president of the American Metal Co., has been appointed Employment Director in New York State for the U. S. Employment Service.

Frederick G. Lasier, mining engineer of Detroit, Mich., has been commissioned a captain in the Engineer Corps and ordered to Camp Humphreys, Virginia, for training.

William Frazer, superintendent of the Davis Daly Copper Co., of Butte, Mont., who has been in California for several months for his health, has returned to Butte.

G. J. Mackay, recently assistant inspector of industrial and technical education for Ontario, has been appointed professor of metallurgy at Queens University, Kingston, Ontario.

A. T. Thomson, assistant to the president of the Phelps Dodge Corporation, has returned to Douglas, Ariz., from Los Angeles, where he recently underwent an operation.

W. J. Melville, superintendent of the Dominion Mines and Quarries in Quebec, has been transferred to the company's offices at Niagara Falls. He is succeeded by **Martin Schwener.**

L. J. Mayreis will be in charge at the Burma Mines, at Namtu, Burma, until the arrival of **R. G. Hall,** of St. Louis, Mo., whose appointment as resident manager was recently announced.

H. Mortimer Lamb, accompanied by **Theo Denis,** superintendent of mines for Quebec, paid a visit to the asbestos and chrome districts recently in the interest of the Canadian Mining Institute.

Harry H. Stout, smeltery superintendent at Douglas, Ariz., for the Copper Queen branch of the Phelps Dodge Corporation, has been commissioned a lieutenant colonel in the Ordnance Department of the U. S. Army.

Willis Warner has been made general chemist of the Republic Iron and Steel Co., Youngstown, Ohio, and placed in charge of the openhearth and blast furnace laboratories, succeeding **T. J. Davies,** resigned.

J. A. Harvey, who has been associated with the development enterprises of M. J. O'Brien, of Renfrew, Ont., for several years, has been appointed to the faculty of applied science at Queens University, Kingston, Ontario.

Max. J. Welch, who has been designing a plant for extracting potash and aluminum by a new process for the American Metal Co. in New York, has returned to Los Angeles, where he will stay until the first of the year.

Edward P. McCarty, consulting mining engineer of Minneapolis, Minn., was commissioned a captain of engineers during September, and is now at Camp Humphreys, Va. He has temporarily closed his office at 318 Palace Bldg., Minneapolis.

S. E. Slipper, of the Canadian Geological Survey, who has been inspecting oil development work in the Peace River field, is leaving the government service to direct oil-drilling operation for a private company at High Prairie, Alberta.

T. H. Symington has been made a special assistant to the Chief of Ordnance and will be in direct charge of the metal components of artillery ammunition. He is a member of the firm of Symington-Anderson Co., of Rochester, N. Y., iron and steel manufacturers.

Joseph A. Thomson, who has been active for the last three years in the development of chrome interests and chrome exports in Black Lake and Danville districts of Quebec, has begun operations at the Port au Port chrome deposits in Newfoundland.

Cefernio Carreno, representing the Chilean Government, was at Nacozari, Sonora, Mexico, last month, where he inspected the operations of the Moctezuma Copper Co. He then went to Douglas, Ariz., and from there to Ajo, where he visited the plant of the New Cornelia company.

Charles A. Burdick has returned to New York after making an examination of deposits of high-grade manganese ore suitable for chemical purposes. Mr. Burdick visited many properties in the Rockies from Montana to Mexico, as well as those in Arkansas and in the Appalachians.

W. Spencer Hutchinson, of Boston, has been examining the Ajax mine of the Carolina Company at Cripple Creek. During the last summer he also examined the vanadium properties of the American Vanadium Co. at Minas Ragra, Peru, as well as that company's molybdenite deposits at Jauja.

J. M. Forbes, who has been manager of the Federal Asbestos Co., at Robertson Station, Que., has accepted a position with the Reid Newfoundland Ry., with offices at St. Johns. The management of the Federal Asbestos Co. will be conducted by the Jacobs Asbestos Co. of which it is a branch company.

Rudolf Gahl has opened a consultation office at the First National Bank Bldg., Denver, Colo., and will continue to specialize in the treatment of copper ores by wet methods. Equal attention will be given to the metallurgical design of new plants and to the solution of problems arising in connection with those now in operation.

Conrad Wolfle, of Spokane, president of the United Copper Mining Co., of Washington, has been made chairman of the Washington board of advisers to assist the director of the U. S. Bureau of Mines in securing deferred classification of miners and furloughs for miners who have been drafted. Other members of the Washington committee are W. R. Rust, of Tacoma; George Turner, of Spokane; George S. Railey, Republic, and W. J. C. Wakefield, of Spokane. **Frederick Burbidge,** of Wallace, Idaho, is chairman of the Idaho board, and **John Gillie,** of Butte, is chairman of the Montana board.

Obituary

Edward Randolph, president of the Balbach Smelting and Refining Co., died suddenly of apoplexy on Oct. 11 at the company's plant in Newark, N. J., aged 47 years. He was a member of the American Institute of Mining Engineers.

Lieut. Sydney A. Lang, of Toronto, aged 34 years, died in the Officers' Hospital, St. John, Que., on Oct. 5, of Spanish influenza. He had been serving with the Canadian engineers, but was unable to go overseas on account of an injury to his knee. Lieutenant Lang was graduated from the School of Science, Toronto, in 1913, and went to Chile as a mining engineer, returning to Canada to enlist on the outbreak of the war.

Industrial News

Manhattan Oil Co. has removed its offices in Tulsa, Okla., to the Cosden Building.

Chicago Pneumatic Tool Co. has appointed B. H. Tripp as district sales manager for the Pacific Coast. Mr. Tripp succeeds M. W. Priseler.

S. R. Vanderbeck, vice president of the Electric Furnace Construction Co., Philadelphia, has resigned to become president of the American Metallurgical Corporation, of Philadelphia. The latter company controls the Philadelphia Electric Steel Corporation, makers of electric steel castings. The business of the corporation covers the conditions entering into the design of all types of electric furnaces for melting and heat treatment. F. J. Ryan is general manager of both companies.

Trade Catalogs

Minerals. Ward's Natural Science Establishment, 84-102 College Ave., Rochester, N. Y. Price list No. 187; 6 x 9½; pp. 8; September, 1918; a price list of minerals sold by weight. Price list No. 188; 6 x 9½; pp. 16; September, 1918; a price list of rocks, American and foreign. Price list No. 190; 6 x 9½; pp. 24; Sept. 1, 1918; a summary of collections of rocks and minerals for sale.

Condensers, Pumps, Cooling Towers, Etc. Wheeler Condenser and Engineering Co., Carteret, N. J. Bulletin 112-A, 1918; 8 x 12½; pp. 32; illustrated. Those contemplating the installation of a condenser may be interested in a discussion in this bulletin, entitled "Choice of Kind of Condenser," and in the illustrations and descriptions of other Wheeler condensing machinery in detail. The bulletin embraces large and small surface condensers, showing typical complete installation; rectangular and cylindrical types; jet condensers; barometric condensers; Wheeler-Edwards air pumps; Wheeler rotative dry vacuum pumps; the Wheeler turbo-air pump; centrifugal pumps for circulating water; natural and forced draft cooling towers; the Wheeler feed-water heater and Wheeler multiple-effect evaporators and dryers.

New Patents

United States patent specifications listed below may be obtained from "The Engineering and Mining Journal" at 25c. each. British patents are supplied at 40c. each.

Alloy Containing Cu, Ni, Fe, Zn, Pb and a trace of P. Foster Milliken, Lawrence, N. Y. (U. S. No. 1,277,989, Sept. 3, 1918.)

Alloy Steel Containing Mo in addition to Usual Constituents. Childe Harold Wills, Detroit, Mich. (U. S. No. 1,278,082; Sept. 3, 1918.)

Flotation Process and Apparatus. Jackson A. Pearce, Idaho Springs, Colo. (U. S. No. 1,277,750; Sept. 3, 1918.)

Furnace, Electric. Horace Freeman, Niagara Falls, Ontario, Canada, assignor to American Cyanamid Co., New York, N. Y. (U. S. No. 1,277,899; Sept. 3, 1918.)

Iron—Process of Making Magnetic Product in Furnace. Trygve D. Yensen, Swissvale, Penn. (U. S. No. 1,277,523; Sept. 3, 1918.)

Mine Cars, Rotary Dump for. Joseph Bierer and Edward N. Zern, Morgantown, W. Va., assignors of one-third to Everhart Bierer, Morgantown, W. Va. (U. S. No. 1,277,836; Sept. 3, 1918.)

Steel Containing 1.2 to 3.5% C, 8 to 20% Cr, and 1 to 6% Co. Paul Richard Kuehnrich, Sheffield, England. (U. S. No. 1,277,431; Sept. 3, 1918.)

Sulphuric Acid, Manufacture of. Arthur B. Foster, Washington, D. C. (U. S. No. 1,277,896; Sept. 3, 1918.)

Tungsten Trioxide, Method of Producing Finely Divided. Carl A. Pfanstiehl, Waukegan, Ill., assignor to Pfanstiehl Co., Inc., North Chicago, Ill. (U. S. No. 1,277,475; Sept. 3. 1918.)

Editorial Correspondence

SAN FRANCISCO—Oct. 8

The American Mining Congress contemplates the organization of a California chapter, and preliminary steps were taken recently at a meeting at the Engineers' Club, when Secretary Callbreath addressed mining men on the results of the Reno meeting, which was held for the consideration of the gold-mining situation. California mining men suggested the organization of a chapter of the congress, and Albert Burch was selected as chairman of a committee for preliminary arrangements. Mr. Burch appointed Fletcher Hamilton and L. D. Gordon, and the committee is arranging for definite preliminary action. The California Metal Producers' Association will hold its annual meeting on Oct. 23, and following that gathering the committee for organization of the American Mining Congress chapter will probably arrange for its meeting, taking advantage of the presence of mine superintendents, operators and owners, to follow the Metal Producers' annual conclove. The sense of representative mining men on the subject will be obtained, at any rate, and there is little doubt that the organization of the chapter will follow.

Water Production in the Oil Fields of California is an important factor in the problem of increasing oil production that is being solved in a practical way by the state oil and gas supervisors. In his report for the week ended Sept. 28, R. P. McLaughlin, chief supervisor, says that although the new wells reported are the principal indication of the maintenance of oil production, a study of proposed deepening and redrilling operations is interesting in showing what can be done toward increasing production by decreasing the amount of water that is necessary to raise the oil to the surface. The second annual report of the supervisor, recently issued, shows that the production of Los Angeles and Orange counties during June, 1917, was 1,396,020 bbl. of oil and 321,840 bbl. of water; fields in Ventura county produced 81,840 bbl. of oil and 31,620 bbl. of water; Santa Barbara County produced 477,408 bbl. of oil and 207,135 bbl. of water; Coalinga field, 1,282,662 bbl. of oil and 313,138 bbl. of water. Complete production figures for Kern County were not available at the time of the report, but the figures given for other fields show 873,735 bbl. of water, an average of 21%, produced with 3,237,870 bbl. of oil.

DENVER—Oct. 10

Replacement of Orebodies is the object of a special allowance provided for in one of the proposed amendments to the Revenue Bill. This replacement allowance is in addition to that for depletion, and is to be sufficient to replace the ore extracted during the year. The cost is to be fixed in each district, and the amount allowed is to be used in further prospecting or development to replenish the ore reserve. This allowance is to be granted when the regular depletion allowance is not sufficient to meet the cost of such replacement. Colorado mine operators are urging their senators to work for favorable action on this amendment.

All Persons Possessing Platinum in Colorado have been warned that they must take out licenses. Applications for licenses may be filed with county clerks or other regularly appointed agencies now under Federal control. All applications will be sent to Washington for approval. Considerable platinum is held by jewelers in Colorado, and a good deal is owned by individuals. Most of the metal so held is in the form of jewelry and ornaments. Owners are being urged to report at once and obtain permits to hold these possessions, in order to avoid possible embarrassment later. Thomas S. Price, United States explosives inspector for Colorado, has been notified that persons and firms having platinum, iridium, and palladium in their possession and not reporting same are liable to a fine of $5000, or imprisonment for one year, or both. The warning was issued by the U. S. Bureau of Mines, in accordance with a law passed by the last Congress which placed platinum, iridium, and palladium under Federal control. The act prohibits the use of platinum in the manufacture, alteration or repair of any jewelry or ornament. It also restricts the use of platinum in dentistry.

PHOENIX, ARIZ.—Oct. 11

A Proposed Change of the workmen's compensation laws will be voted upon at the coming election, and it is being fought by trades unions and by attorneys who have specialized on personal-damage suits. The new reading is declared to be just and reasonable for both sides, designed to avoid necessity for appeal to the courts and to assure immediate relief for injured employees of the mines, especially. Even a provision making the measure elective in case of injury has not served to diminish the opposition, though a number of labor leaders are giving strong support to the new plan. The measure is especially favored by the smaller mining operators, whose casualty insurance rate lately was advanced to 10.4%. They have just met in Phoenix to consider this phase of their expense accounts and also to join in a petition for the allowance of fuel oil for certain kinds of prospect work. For instance, one Bisbee company, without surface showing, has $15,000 ready for sinking to the ore level, but is able to secure no fuel.

MAYER, ARIZ.—Oct. 1

Manganese Deposits in the Big Bug district are situated at the confluence of the Agua Fria, Big Bug, and Cycamore, creeks 13 miles east of Mayer. The manganese occurs as nodules and irregular stratified veins, of horizontal attitude, from 1 in. to 3 ft. in thickness, lying above and somewhat mixed with a chalcedonic variety of silica and travertine, overburdened by a soft semi-stratified sand and clay that is in turn capped by a layer of basalt. Deposits are confined to a single stratigraphic horizon, and cover an original area of 4 by 5 miles, but the erosion by several streams has left the manganese in isolated patches of from 5 to 20 acres in extent. Ore is principally psilomelane, although pyrolusite has been identified in small quantities; also a bog variety brecciated with clay and silica. The problem of deposition does not appear clear, but in consideration of the fact that the schist and lime formations of higher stratigraphic positions yield various amounts of manganese, the Big Bug deposits may be redepositions from an older group of planation. Most of the manganese occurs close to the surface, and mining has been confined to open cuts and short adits. To date, seven car lots have been mined and shipped, averaging 43% in manganese and 1 to 6% in silica.

WALLACE, IDAHO—Oct. 5

Recovery of the Valuable Mineral Content in the tailings from various mills of the Coeur d'Alene district has grown to be an important branch of the mining industry, and no fewer than six mills, of varied capacities and designs, but all chiefly dependent upon flotation, are in operation. In the early days of the district, milling methods and mill equipment were decidedly crude compared with the metallurgical efficiency of today, with the result that mineral recovery was often not more than 50%. The tailings were discharged direct into a creek or river, and within a few years channels were filled with tailings and the consequent overflow deposited them on adjacent land. Thus the mining companies were confronted with numerous claims for damages by property owners along the streams. As a solution to the difficulty, and as a protection against further damage suits, the operators bought large tracts along the river and constructed dams, which served as great settling ponds for the slime tailings, and at the same time the coarse tailings were banked on ground adjacent to the mills. During the intervening years, changes and improvements have been made in milling processes which have greatly reduced the tailings losses, but while these improved processes were being evolved, the creeks and rivers continued to carry down rich slime tailings, which have accumulated in the dams built for their reception, and great dumps of coarse tailings were built up which contain sufficient of value to pay for regrinding and recovery. In some cases the original companies are retreating these tailings, but generally it is being done by independent companies, which lease the dumps and dams and erect small milling plants embodying the special treatment required.

HELENA, MONT.—Oct. 8

A Mine Operators' Association of the manganese miners and producers of Philipsburg and Butte is being organized for the purpose of formulating a request to the Government for a fair and reasonable consideration of their claims, especially as to time contracts in selling their ores. Among the claims made by the producers are that manganese is second only to copper in importance, and that the Iron and Steel Institute, by agreement with the War Industries Board, fixed the price of ferromanganese and all manganese ores without consulting the miners who produced the ores. At the conference, the price of ferromanganese was fixed at $250 per ton. The grade was lowered from 80% to 70% manganese, and the unit premium value was placed on the amount of manganese in the ferromanganese product in excess of 70%, so that the old standard of 80% manganese netted the ferromanganese manufacturer $290 per ton. On the rate adopted, the manganese miners received for their ores, to make a ton of ferromanganese, less than $75 per ton delivered at the ferromanganese furnace. The miners of Philipsburg declare they are compelled to pay freight on a standard ton of 2000 lb. whereas they receive pay for their ores on a basis of the long ton of 2240 pounds. It is further claimed that all ore produced in Montana is siliceous, and that much of it requires concentrating, and producers are obliged to build concentrators and install expensive machinery for the purpose of concentrating such ores as will not stand the high freight rates East.

BATESVILLE, ARK.—Oct. 8

The Everton Mining and Development Co., which is operating in Pugh Hollow, in the Lafferty Creek district, is making the first experiment with table concentration of manganese ore that has been made in this field. The ore carries from 25 to 29% manganese and the gangue is clay and silica. There are other immense deposits of manganese ore in the field. By concentration, the grade of the crude ore is raised to 34.10%, and it is expected that this can be improved. To date no effort has been made to save the fines, and assays made from the tailings carried by the overflow from one washing plant carried 8.40% manganese; and if it can be demonstrated that the valuable content of the fines can be saved by means of tables, it is certain that several will be installed within the next few months. The experimental plant constructed by the Everton company consists of one ½-in. and one ¼-in. mesh trommel, screen, a vortex classifier, a settling tank, and two Wilfey tables, one riffled for sludge and the other for a coarser product. The crude ore is first passed through the ½-in. mesh trommel screen, then through the ¼ in. Both of the screens have inside and outside spray pipes. From the screens, the product passes through the vortex classifier, which divides the material into two sizes, and each size is sent to the two-compartment settling tank. From there the product goes to the tables; the coarser to the rougher table and the finer to the sludge table. Tailings from the rougher table are also put over the sludge table. A recovery of 45% is obtained at the plant, which was built to determine what equipment would be needed to save all values in the 300-ton washing plant now under construction.

CLEVELAND, OHIO—Oct. 8

Iron-Ore Shipments during September were 8,995,014 gross tons, as compared with 9,725,331 tons in August and 9,536,152 tons during September, 1917, according to *Iron Age*. Shipments, however, still exceed those of a year ago, the movement from the Lake Superior district until Oct. 1 being 48,321,278 tons, as compared with 46,059,706 tons up to Oct. 1, 1917. A year

ago the greater part of the vessel capacity was being used to carry ore, as it was desired to bring down as much as possible during the latter part of the season. The establishment of a basic eight hour day by the United States Steel Corporation will apparently have little effect upon the iron-ore mining districts, as the mines have been generally on an eight-hour basis for the last two years.

TORONTO—Oct. 12

Construction of a New Roadway to the Boston Creek gold camp will be started as soon as the necessary labor is obtainable. The government engineers have arrived to survey the route. The mineralized zone, so far as determined, lies directly east of the Temiskaming & North Ontario Ry., so that the roadway will pass through a country possessing important prospective opportunities. In addition to serving Boston Creek, it will tap Skead Township to the east, which is regarded as a separate field.

Members of the Staff of the Ontario Bureau of Mines, including Cyril W. Knight, A. G. Burrows, P. E. Hopkins, and A. L. Parsons, are examining and mapping the geology of the territory lying south and west of Lake Abitibi, including the Lightning River area and Rickard Township, where important gold discoveries have been made. The department hopes to issue the map in time for use next spring, so that the results of the investigation of this field will be available for prospectors, many of whom will probably be found among the returned soldiers. Deputy Minister Gibson considers that the work of the bureau in directing attention to new fields for prospecting can materially assist in the solution of the problem of providing suitable and congenial employment for the veterans, a considerable proportion of whom were engaged in mining before the war.

THETFORD MINES, QUEBEC—Oct. 8

In the Asbestos Industry, high prices and intensified production continue to characterize operations. The regular companies show an output for eight months equal to that of last year, and the new companies will give an increase of about 12,000 tons for the year. The Bennett-Martin Asbestos Co., at Coleraine Station, has been making a record, and the returns in both crude and long fiber are particularly gratifying. The new Fraser mine of the Asbestos Corporation of Canada, at East Broughton, is showing high returns in long fibers. The Regina Asbestos Co. and the Berlin Asbestos Co. at Robertson Station, and the Imperial Chrome and Asbestos Co., at Black Lake, are taking advantage of the high prices and show considerable activity. The new milling plant of the Windsor Asbestos Co., at Coleraine Station, was recently burned to the ground, and there is some uncertainty as to whether or not the plant will be rebuilt. The Eastern Townships Asbestos Co., at East Broughton, has been reopened by E. H. Garcin, of New York, with Milton Hersey & Co., of Montreal as engineers.

VICTORIA, B. C.—Oct. 8

A Striking Example of the effect of the reduced purchasing power of gold is shown by the present situation at Rossland, where the mines of the Consolidated Mining and Smelting Co. of Canada have been practically closed down. No ore has been shipped for some months, although work is being carried on in the chief mines of the camp with small forces. Those employed, however, are engaged only in development, preparations being made for the renewal of activity as soon as conditions again become normal. Only about 200 miners are working in the Le Roi, Centre Star, and War Eagle, and about 80 are employed in the Josie, all of which are mines of the Consolidated company. At the Velvet, situated about nine miles from Rossland and owned by the Granby Consolidated company, about 50 men are employed. The people of Rossland, however, are not discouraged. The camp is being sustained by other forms of mining, and better times than ever are anticipated later, when, it is expected, the mines now dormant will be reopened on a larger scale than heretofore, it being the firm belief that the time is not far off when costs will decline and the demand for gold will be insistent.

Approval by the Dominion Government of the proposed investigation of the affairs of the Consolidated Mining and Smelting Co. of Canada has been received. The members of the committee of investigation, who have been endorsed, are S. S. Fowler, chairman; Ivan De Lashmutt, and James Anderson. Mr. Fowler is a graduate of the Columbia School of Mines and a man of wide experience in mining and smelting matters. For several years he was consulting engineer for the British Columbia Goldfields and many other properties, and he is now consulting engineer for the Yankee Girl Gold Mines. He is best known as the manager of the Bluebell Mine, at Riondal, B. C. Ivan De Lashmutt, the superintendent of the Standard Silver Lead Mines, at Silverton, B. C., was for many years with the Anaconda smeltery and later was testing engineer for Utah Consolidated. He is a graduate of the Colorado School of Mines, and for some time held a post as professor of metallurgy at the University of Arizona. James Anderson is the mayor of Kaslo, B. C., and has had extensive mining interests in British Columbia for many years. He is the agent for the George Alexander interests, which control the Nettie L., Ruth, Silver Cup and other properties.

The Mining News

ALASKA

KENNECOTT (Kennecott) — September production of Alaskan properties was 5,508,000 lb. of copper.

ARIZONA

Cochise County

SHATTUCK ARIZONA (Bisbee) — September production was: Copper, 686,844 lb., lead, 325,496 lb.; silver, 8,621 oz. and gold, 105.09 oz. Production for nine months in 1918 was: Copper, 7,247,903 lb.; lead, 969,961 lb.; silver, 109,081 oz., and gold, 924.60 ounces.

DURING SEPTEMBER, 357 cars of ores and concentrates were sent through Douglas from Mexico.

CALUMET & ARIZONA (Warren) — Smeltery production during September amounted to 7,298,000 lb. of copper, of which 4,868,000 lb. was available for Calumet & Arizona.

Gila County

IRON CAP (Globe)—Shipping 10 carloads a day, including 100 tons of concentrating ore. Smelting ore goes to El Paso and concentrating to the Old Dominion. Output running about 1,000,000 lb. of copper a month. Iron Cap shaft down to 1100 ft., where good ore was broken in cutting the station, and will be continued to 1200. To build spur track to shafts. Has purchased a new 3000-ft. compressor and more boilers, and will secure additional power from the Inspiration electric system.

SUPERIOR & BOSTON (Globe)—Development on 1200 level to be extended eastward. Added equipment gives present pumping capacity of 2,000,000 gal. per day.

INSPIRATION (Miami)—To generate most of its own power, as electric supply from Roosevelt is small, on account of low level of Roosevelt reservoir.

Greenlee County

RIVAL (Twin Peaks)—Property shut down and machinery will be sold.

Pima County

NEW CORNELIA (Ajo)—September production was 3,744,000 lb. of copper.

Santa Cruz County

CONSOLIDATED ARIZONA (Patagonia)—New hoist installed on property at Mowry. W. J. Mitchell is manager.

HOSEY (Patagonia)—Property in the Santa Rita Mountains taken over by the Marguerite Mining and Smelting Co., of which E. R. Grund, of St. Louis, is president and general manager. Ore shipments have been started.

Yavapai County

NELSON (Crown King)—Taken over by Philadelphia Mining Co. George P. Harrington is in charge.

SWASTIKA (Crown King)—Taken over by Consolidated Arizona Smelting Co., of Humboldt, on surrender of lease of Frank W. Giroux.

BAUMANN (Humboldt)—Shipping copper ore.

DUNDEE-ARIZONA (Jerome)—Shaft sinking, stopped by water last January at 500 level to be continued to 969 ft. depth and drift driven to connect with United Verde Extension tunnel.

GRAND ISLAND (Jerome)—Work resumed on shaft, to be sunk from 300 level to 535 and then drift 200 ft. to cut vein. R. E. Moore, of Jerome, is president and managing director.

UNITED VERDE (Jerome)—Laying track on new high-line railroad from Hopewell tunnel mouth to old smeltery site above Jerome, where steam-shovel operations are to be started soon on the apex of the orebody.

VERDE COMBINATION (Jerome)—Manager Dave Morgan has started a new "drive" in the district by refusing to employ any one who cannot show a Liberty Bond receipt.

ARIZONA DAISY (Prescott)—New hoist installed on copper vein.

BLACK DIAMOND (Walker)—Purchased three claims from D. L. Booker.

ARKANSAS

Independence County

McCURRY (Anderson) — Completed installation of small washing plant and is producing concentrates; also some nugget ore.

BALL (Batesville)—Made rich strike of nugget and wash manganese ore recently. Operated by Shepherd and Wilson.

BLUE PIG (Batesville)—To install log washery and operate steam shovel. Intend to purchase log washer, engine, boiler, steam shovel and pipe. A. Besse is superintendent.

EUREKA (Cushman)—Installing three 3-cell jigs.

GEORGE (Cushman)—Logan Reeves and associates have installed a steam shovel and are securing a good production of high-grade nugget manganese ore.

CALIFORNIA

Amador County

SILICATE DEPOSIT producing material for shipment to Indiana glass manufacturers being hauled to railroad at Carbondale by motor trucks.

Butte County

BANNER (Oroville)—Court order issued for sale of property to satisfy judgment of $6110 in favor of Charles Lastreto, of San Francisco. Large producer in early days. Recent attempts to reopen have not been successful.

Calaveras County

PENN COPPER (Campo Seco)—Good ore coming from lower levels. Smeltery at Valley Springs treating large tonnage.

NAPOLEON COPPER (Copperopolis)—New 90-ton plant, consisting of two ball mills, flotation unit, two concentrators and Diesel oil-burning engines, completed. Has also installed precipitating boxes for handling water carrying copper in solution.

El Dorado County

SHIPMENTS OF CHROME ORE are being made from El Dorado County; the Negor Hill, Clarksville, and Latrobe districts, extending along the serpentine belt at the extreme west end of the county, being the largest shippers. Next come the Greenwood and Georgetown districts, in the northwest part of the county. In these two districts a large tonnage of the chromite ore is being mined and shipped from the Shepard, Castillo, Federwitz and Johnson leases. A. H. Simpson, of Placerville, general manager for the Union Chrome Co. of San Francisco, is handling the ore from these four leases. The Johnson lease is averaging one 60-ton car per week. The ore is hauled by Marmon trucks to Placerville station and loaded into cars of the Southern Pacific line. Johnson & Fitzlaaf have the trucking contract.

Humboldt County

CHILDS MOUNTAIN MANGANESE (Blocksburg)—New five-mile road completed. Ore hauled 3½ miles by team and 20 miles by motor trucks to Fort Seward, on Northwestern Pacific Railway.

Madera County

BUCHANAN (Madera)—Shipped five carloads of ore to Selby, and 10 carloads now ready for shipment. Five-ton motor truck hauls ore to railroad.

Nevada County

KENOSHA (Grass Valley)—Arrangements complete to reopen and develop. Fine prospect in early days, but never practically developed.

Placer County

CRANDALL (Auburn)—Eighteen-inch vein of high-grade ore reported. Mine was large producer in early days.

Plumas County

DROEGE (Greenville)—Good ore cut 300 ft. from prior development. Operations increased.

MILCAWLOR COPPER (Keddie)—Contemplates development of property in Indian Creek and Lights Canyon districts.

Shasta County

DELTA CONSOLIDATED (Delta)—Good ore reported in recent development. To resume regular operation.

GLADSTONE (French Gulch)—Electric hoist, which cost $13,000 five years ago, has been sold at the same price to Tintic Mining Co., Utah. Cost $2000 to remove and ship. Hoist was used at end of 3600-ft. tunnel to lift ore 1500 ft. Mine closed down two years.

MOUNTAIN COPPER (Keswick)—Enlarged flotation plant in operation.

Siskiyou County

CHROME SHIPMENTS to Gazelle, Hornbrook, and Yreka have been retarded by the September rains, which were unusual all over the state. In some of the higher elevations where the snowfall is always heavy, mining has been suspended for the winter. Discoveries of new chrome deposits are reported from Callahan, Happy Camp, Seiad, and other camps.

IDAHO

Shoshone County

COEUR D'ALENE ANTIMONY (Kellogg)—Cut body of high-grade ore in drift from botton of shaft, which is down 275 ft. Two levels above have considerable ore. New mill making satisfactory recovery. Equipment includes flotation.

IDAHO-CARBONATE HILL (Mullan)—Shaft down 300 ft. and is being sunk at the rate of 115 ft. per month. To be sunk 800 feet.

RED MONARCH (Wallace)—Work suspended in crosscut, as south line has been reached at 4410 feet. Three veins were cut, the first showing lead-zinc ore, which is now to be further explored. Two other veins are promising and will be developed when mining conditions are more favorable.

REX CONSOLIDATED (Wallace)—Negotiating with Red Monarch for extension of crosscut under Rex shaft and connection by raising 270 ft. Face of crosscut 1200 ft. from point under shaft, which is down 700 feet.

MINNESOTA

Cuyuna Range

PORTSMOUTH (Crosby)—Stripping by steam shovel. Gordon Mining Co. will ship next season.

SAGAMORE (Ironton)—Property leased by John H. Savage & Co.; will develop by hydraulic and steam shovel methods.

Mesabi Range

INTERSTATE IRON (Calumet)—To construct washing plant to treat ores from Hill-Annex mine.

OLIVER—(Hibbing)—Building new hospital at Alice.

WINSTON-DEAR (Hibbing)—Warehouse completely destroyed by fire on September 28.

STEVENSON (Keewatin)—Has resumed stripping operations due to cleaning up of all ore available in pit.

NEVADA

Esmeralda County

ATLANTA (Goldfield)—Exploring vein down to 1900 level.

GOLDFIELD MERGER (Goldfield)—Work in Merger ground discontinued until results of development work now under way in deep levels of adjoining Atlanta ground are known.

GREAT BEND (Goldfield)—Shipping-grade ore sorted from that broken on 160 level. Drifting in low-grade ore on 375 level, and it is expected that ore opened on levels above will be cut soon.

Humboldt County

GOLD CIRCLE MINES now employing about 180 men, and regular shipments of gold bullion being made from district. Elko Prince mill is operating steadily and also treating ore from Rex mine, recently purchased by Elko Prince company. Missing Link mine, purchased by George J. Shoupe, is shipping crude ore to smelting plants.

Nye County

MANHATTAN CONSOLIDATED (Manhattan)—Sufficient ore on dump and blocked out in the mine to justify milling operations.

UNION AMALGAMATED (Manhattan)—One shift working, and operations confined to 500 level.

TONOPAH EXTENSION (Tonopah)—Receipts from mine and mill operation during August were $125,344.41; current expenses, $87,969.29; leaving an operating profit of $37,375.12.

NEW MEXICO

Grant County

ATWOOD (Lordsburg)—Unwatering main shaft preparatory to sinking. Work on new shaft on Southern group, adjoining, is progressing satisfactorily.

BONNEY (Lordsburg)—New pumps being installed on sixth level. Ore shipments again started to Copper Queen smeltery at Douglas.

GREAT EAGLE (Lordsburg)—Compressor placed on foundation; new grizzlies and sorting tables installed; ore bins being enlarged, and new machine shop, blacksmith shop and boarding house being built. Shipping 20 tons of fluorspar daily.

CHINO COPPER (Santa Rita)—Six Mexicans were the first to buy Fourth Liberty Loan bonds, each subscribing for $500 and paying $100 in cash at the mine office.

OKLAHOMA

Joplin District

PROSPECTORS (Hockerville)—Plan erection of concentrator as soon as shaft reaches second ore level at 180 feet.

BIG JIM (Miami)—Sinking shaft, following careful drilling of 40-acre lease southeast of Douthat, Okla. To erect mill.

KELTNER (Picher)—Cut ore at west shaft and will operate mill in two shifts.

MISSOURI MULE (Picher)—Operating after shutdown due to water. Standifer brothers, of Miami, are operators.

KEN TEX (Quapaw)—Recently completed 300-ton mill. Closed down after operating six days.

PRAIRIE (Quapaw)—To erect 150-ton mill at Sunnyside, near Lead Boy.

GOOD EAGLE (Tar River)—To start up operations after shut-down due to installation of gas engine and drilling campaign.

OREGON

Coos County

SEFFERN COMPANY (Marshfield)—Mining of black sand chrome deposit to start upon arrival of $35,000 worth of machinery.

Douglas County

OREGON NICKEL (Riddle)—Mining chrome ore.

Jackson County

COPPER KING (Jacksonville)—Extensive improvements being made at this copper mine in the Blue Ledge district.

Josephine County

PACIFIC PLACER (Grants Pass)—Extensive equipment being erected at property known as the old Layton mine.

VIRGINIA

Bath County

PYROLUSITE OF HIGH GRADE and low in impurities and a large deposit of iron ore have been found recently by Stuart D. Marshall, consulting engineer, of Roanoke. The discoveries were made on the 2700-acre tract of timberland belonging to Boyd Stephenson, of Monterey.

CANADA

British Columbia

MONITOR (Alberni Canal)—Temporarily closed down. Contemplating reorganization to permit reopening.

OLD SPORT GROUP (Elk Lake)—Consolidated Mining and Smelting Co. continuing development. Diamond drilling has shown satisfactory results.

EUREKA MINE (Nelson)—Lease has been taken on power plant of Kootenay Gold Mines, and a 6000-ft. air line built. Repairing of tramway and wagon road, and timbering of shaft completed. Mine operated by Inland Mining Co. of Walla Walla, Washington.

SUNLOCH MINES (Vancouver)—Development proceeding. Wagon road has been built for transportation of supplies. R. H. Stewart is manager.

Ontario

NEW MINING SCHOOL has been established at Haileybury, and is provided with equipment for the treatment of ores, including the flotation process. The school is under the management of a board consisting of F. D. Reid, superintendent of the Coniagas mines, chairman; J. J. Denny, manager of the research department of the Nipissing mines; M. F. Fairlie, manager of the Cobalt Reduction Co., all of Cobalt, and E. A. Collins, of Haileybury, mining inspector. Thirty-five pupils have been enrolled for the present term.

McKINLEY-DARRAGH (Cobalt)—Flotation plant to be closed for the winter soon.

MINING CORPORATION (Cobalt)—Extensive exploration work to be carried on at property recently acquired in Bucke Township near North Cobalt.

ONTARIO KIRKLAND (Kirkland Lake)—New plans for development include 1700 ft. underground work. Main shaft will be sunk to 300 level.

COTTER (Boston Creek)—Diamond drilling has been started.

MILLER INDEPENDENCE (Boston Creek)—Mill completed and ready for operation. Drifting on 200 level.

HOWIE COCHENOR (Lightning River)—Mining plant installed. Shaft down 40 feet.

PREMIER LANGMUIR (Nighthawk Lake District)—Initial shipment of barite made.

CORDOVA MINES (Belmont Township)—Plant for the manufacture of ferrochromium, under construction, is expected to be ready for operation Nov. 1. Company acquired Belmont gold mine in 1912, and developed water power at the foot of Deer Lake for use in mining operations. Unfavorable conditions caused closing down of mine, and company will now use power for smelting operations. Plant to have capacity of 80 tons per month, and is so designed that other alloys may be produced.

Quebec

INDIAN PENINSULA (Amos Station)—A 100-ton flotation plant being erected. Groch flotation machines will be installed.

MEXICO

Sonora

GREENE CANANEA (Cananea)—Production in September was: Copper, 4,900,000 lb.; silver, 149,332 oz., and gold, 1090 ounces.

PERU

Junin

CERRO DE PASCO (Cerro de Pasco)—September production was 3075 tons of blister copper.

ASIA

Chosen

ORIENTAL CONSOLIDATED (Unsan)—September cleanings amounted to $95,500.

The Market Report

SILVER AND STERLING EXCHANGE

Oct.	Sterling Exchange	Silver New York, Cents	Silver London, Pence	Oct.	Sterling Exchange	Silver New York, Cents	Silver London, Pence
10	4.7550	101⅛	49⅛	14	4.7550	101⅛	49⅛
11	4.7550	101⅛	49⅛	15	4.7550	101⅛	49⅛
12	4.7550	101⅛	49⅛	16	4.7550	101⅛	49⅛

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London quotations are in pence per troy ounce of sterling silver, 925 fine.

DAILY PRICES OF METALS IN NEW YORK

Oct.	Copper Electrolytic	Tin Spot.	Lead N. Y.	Lead St. L.	Zinc St. L.
10	*26	†	8.05	7.75	8.20 @8.30
11	*26	†	8.05	7.75	8.15 @8.25
12	*26	†	8.05	7.75	8.15 @8.25
14	*26	†	8.05	7.75	8¼ @8¼
15	*26	†	8.05	7.75	8.20 @8.25
16	*26	†	8.05	7.75	8.20 @8.30

*Price fixed by agreement between American copper producers and the U. S. Government, according to official statement for publication on Friday, September 21, 1917, and July 2, 1918.

† No market.

The above quotations (except as to copper, the price for which has been fixed by agreement between American copper producers and the U. S. Government, wherein there is no free market) are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for the deliveries constituting the major markets, reduced to basis of New York, cash, except where St. Louis is the normal basing point.

The quotations for electrolytic copper are for cakes, ingots and wirebars.

We quote electrolytic cathodes at 0.05 to 0.10c below the price of wirebars, cakes and ingots.

Quotations for spelter are for ordinary Prime Western brands. We quote New York price at 35c. per 100 lb. above St. Louis.

LONDON

Oct.	Copper Standard Spot	Copper Standard 3 M.	Copper Electrolytic	Tin Spot	Tin 3 M.	Lead Spot	Lead 3 M.	Zinc Spot
10	122	122	137	337½	337½	29½	28½	54
11	122	122	137	337½	337½	29½	28½	54
12	...	...	...	...	...	...	...	...
14	122	122	137	336	336	29½	28½	54
15	122	122	137	336	336	29½	28½	54
16	122	122	137	334	334	29½	28½	54

The above table gives the closing quotations on London Metal Exchange. All prices are in pounds sterling per ton of 2240 lb. For convenience in comparison of London prices, in pounds sterling per 2240 lb., with American prices in cents per pound the following approximate ratios are given, reckoning exchange at $4.7515: £29½ = 6.2576c.; £54 = 11.4545c.; £110 = 23.3333c.; £125 = 26.5151c.; £260 = 55.1513c.; £280 = 59.3937c.; £300 = 63.6362c. Variations, £1 = 0.2121205c.

Metal Markets

Copper—The refinery production in September fell below the figures for August. The refiners are constantly falling behind their expectations. This month the production will be diminished, owing to labor troubles. The men working in the refineries near Perth Amboy, who were frightened away by the recent explosion, have not yet fully returned. Now influenza is making serious inroads.

Copper Sheets—The base price of copper sheets remains at 35½c. per lb. Copper wire is quoted at 29½ to 30c. per lb. f.o.b. mill, carload lots, subject to any change in the price of copper.

Lead—The production in September was a trifle larger than in August. However, the figures reflect only the output of refined pig lead, and not the basic production of the mines, which is probably decreasing rather than increasing. Nevertheless, the situation in lead is distinctly easier, owing to the excellent management of the Lead Committee in controlling non-essential uses.

Our Washington correspondent writes that reports reaching Pope Yeatman, of the War Industries Board, are to the effect that an improvement has taken place in the lead situation. Production was a week oversold on Oct. 1, and there is a possibility that the companies will catch up within the next 30 days on orders that have been cleared. The effect of the work of the many agencies operating to conserve the supply is becoming more and more apparent. There is now enough lead to keep essential users supplied. How long the present good freight movement will last is a question that is giving considerable concern.

Tin—Importers are now out of business for the duration of the war. The whole business has passed practically under governmental control. There has not yet been any statement of what price will be fixed.

Zinc—The decline continued, and some low prices were accepted, but the appearance of some large orders on Monday had the effect of checking any tendency toward demoralization. Low prices were named for the business that was taken.

Zinc Sheets—Unchanged at $15 per 100 lb., less usual traded discounts and extras as per list of Feb. 4.

Other Metals

Aluminum—Unchanged at 33c. per lb.

Antimony—This market became considerably weaker, although there was an inquiry for a large tonnage, which doubtless will be taken if it has not been already. Perhaps the recession in the market was to meet that business. We quote spot at 13⅜@13½c. and futures at 12¼@12½c., c.i.f., in bond.

Bismuth—Metal of the highest purity for pharmaceutical use is quoted at $3.50 per lb. for wholesale lots—500 lb. and over.

Cadmium—This metal is quoted at $1.50 @2 per pound.

Nickel—Market quotation: Ingot, 40c.; shot, 43c.; electrolytic, 45c. per pound.

Quicksilver—Unchanged at $125@130. Stocks in this market are reported light, but there seems to be an unsettled tone.

Gold, Silver and Platinum

Silver—The latest advices from London report China exchanges as still much above the level of the fixed price of silver. This is owing to the diversion of the white metal to India, but an adjustment of the requirements for the various Oriental countries is receiving Government consideration. The shipments to London in the week ending Oct. 12 were 1,132,000 ounces.

The general stock of money in the United States on Oct. 1 totaled $7,322,423,723; of this, $3,079,094,009 was in gold coin and bullion, $374,080,376 in standard silver dollars and $232,403,832 in subsidiary silver. The money in circulation on Oct. 1 was $5,721,433,020, or $53.82 per capita. On Oct. 1, 1917, the per-capita circulation was $46.10.

Mexican dollars at New York: Oct. 10, 78; Oct. 11, 78; Oct. 12, 78; Oct. 14, 78; Oct. 15, 78; Oct. 16, 77½.

Platinum—Unchanged.

Zinc and Lead Ore Markets

Joplin, Mo., Oct. 12—Blende, per ton, high, $78.20; basis 60% zinc, premium, $75; Class B, $65@60; Prime Western, $50@47.50; calamine, basis 40% zinc, $40 @35. Average selling prices: blende, $50.72; calamine, $38.86; all zinc ores, $52.02.

Lead, high, $102.95; basis 80% lead, $100; average selling price, all grades of lead, $99.93 per ton.

Shipments the week: Blende, 10,026; calamine, 632; lead, 1894 tons; value, all ores the week, $722,390.

Price cutting this week brought buying almost to a standstill. The basis price was cut to $50, then to $47.50, with some trying to buy on $45 basis. Sellers would not accept the reductions, and declined to do business.

Platteville, Wis., Oct. 12—Blende, basis 60% zinc, highest settlement price reported, $75; base price for premium grade, $75; base price for high-lead blende, $52 per ton. Lead ore, basis 80% lead, $97.50 per ton. Shipments reported for the week were 2468 tons blende, 328 tons galena, and 508 tons sulphur ore. For the year to date the totals are 101,220 tons blende, 6329 tons galena, and 36,870 tons sulphur ore. During the week 2923 tons blende was shipped to separating plants.

Other Ores

Chrome Ore—Although sellers were reported willing to make concessions in prices, no new business of consequence seems to have been effected.

Manganese Ore—Unchanged.

Molybdenum Ore—The market was dull and there seem to be offerings of ore in excess of the capacity for making ferromolybdenum.

Tungsten Ore—Chinese supplies are being offered more and more freely in this market. Some of this ore is of high grade and relatively free from impurities, but other supplies are impure and unavailable to the manufacturers of ferrotungsten by direct smelting. The works employing the chemical process are of limited capacity, and the ore supply seems to be in excess of what they will take; wherefore, sharp discounts are offered. It is not improbable that the capacity of the chemical plants will be increased in order to take advantage of the profitable differentials. High-grade scheelite was sold this week at $26, and the highest grades of wolframite at $24@25. The market for ordinary grades of wolframite was around $20, and inferior grades were salable only at prices lower than that.

Other Minerals

Pyrites—Prices of domestic pyrites are determined by negotiation between buyer and seller. Prices range between 28c. and 34c. per unit, according to location.

The War Trade Board has authorized the issue of licenses during the remainder of the calendar year, to those qualified to receive them, for the importation from Spain of the unimported balance of the 125,000 tons of pyrites the importation of which was sanctioned prior to Oct. 1, 1918. The amount is approximately 56,400 tons.

Iron Trade Review

PITTSBURGH—Oct. 15

Production of steel ingots in the United States in 1917 was about 43,700,000 gross tons, according to practically complete returns now available, or 1,500,000 tons more than the former estimate, based upon the returns of the 29 steel companies which make monthly reports of output. The gain over the 41,400,000 tons produced in 1916 is not altogether unsatisfactory. The monthly reports of the 29 companies indicate an increase in the rate of production from August to September of 12%, a large gain, even though August production was low. The rate of output in September was nearly 47,000,000 tons per annum, or close to rated capacity and by far the best showing thus far made. October is expected to do still better.

Ingot production presages an output of finished rolled steel in the third quarter

of 9,500,000 net tons, and, with only a slight gain over the September rate, the fourth quarter should show more than 10,000,000 tons, making between 19,500,000 and 20,000,000 tons for the half year. With increasing demands from General Pershing and our Allies, the War Industries Board has been unable to reduce its estimate that not less than 23,000,000 tons is required for the half year, so there is to be an actual deficit of more than 3,000,000 tons. This will fall in various places. The factor of safety in shipbuilding and shell making, whereby the production of steel was being kept well ahead of consumption by forge shops and shell factories and by fabricating interests and shipyards, will be reduced. Chairman Baruch of the War Industries Board, in a public statement, pays a high tribute to the general manner in which Director General of Railroads McAdoo renounced a large quantity of steel allotted to the Railroad Administration, in favor of General Pershing, and notes that this may result in transportation difficulties this winter, for which the Railroad Administration will not be to blame. In this matter much depends upon the weather.

A large part of the deficit will fall upon commercial consumers whose operations have been recognized as distinctly helpful in winning the war. Practically all the consuming industries with which arrangements for curtailment of operation have been made will receive less steel than the reduced programs require. The agricultural implement makers, who have B-2 priority on their steel, cut by 25% for the twelvemonth beginning this month, will receive little steel this quarter, and many other manufacturing consumers are similarly situated. Practically all mills will be able to cover AA and A priorities to Jan. 1, but many will do little on B priorities, and the preference list, as such, will receive exceedingly small supplies.

Spanish influenza is affecting mill and furnace operations somewhat, but the epidemic is not as bad as at the cantonments or in cities, and some men giving the disease as cause for absence have possibly laid off for other reasons.

Pig Iron—Production of pig iron in September was at the rate of nearly 42,000,000 tons per annum, a gain of about 4% over the August rate. Capacity is figured at not under 43,000,000 tons, and the proportion of furnaces in blast is above rather than below normal. There is scarcely any shortage of coke, in point of tonnage, but poor quality is said to be restricting production. Quality is reported improving slowly as a result of efforts of the Fuel Administration. There are practically no sales in the open market, and even allocations are difficult to secure. Some large steel interests, normally self-supporting in pig iron, are short of iron, as they cannot secure a normal supply of scrap and need more pig iron in consequence. The market remains quotable at the maximum limits: Bessemer, $35.20; basic, $33; No. 2 foundry (1.75 to 2.25% silicon), $34; malleable, $34.50; forge, $33, f.o.b. furnace, freight from Valleys to Pittsburgh being $1.40 and from six detached furnaces somewhat less.

Steel—Several wire mills are now called upon for more shell rounds, to be rolled in their billet mills, and wire production will be correspondingly reduced. The plate allotment for shipbuilding cannot be increased, and will remain at the 50,000 tons a week that has obtained for several months. Shell-discard steel is being offered in a limited way. Middlemen are prevented from buying and selling, but may act as broker between producer and consumer, collecting a commission from the seller, but not adding a commission to the set price. The market remains quotable: Billets $47.50; sheet bars and small billets, $51; slabs, $50; rods, $57.

Ferroalloys

Ferroalloys—Ferromanganese is only moderately active, and with heavy production little fear is entertained of a shortage. Spiegeleisen is quiet. We quote 70% ferromanganese at $250, delivered, with $3.50 per unit for additional manganese, and 16% spiegeleisen at $75 f.o.b. furnace, with rumors of slight shading in a few instances.

Coke

Coke—Beehive-coke production has been tapering off a trifle, but byproduct output continues to increase. Supplies seem to be approximately sufficient for blast furnaces, but afford no opportunity to accumulate reserves against the winter. If the Fuel Administration can find more outside coal for byproduct ovens after Lake shipments are taken care of, it will be possible to allow more Connellsville coal to remain in the region and be coked in beehive ovens that have been forced lately to blow out. Connellsville coke continues quotable at the set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30, clean screenings from old dumps, over ½-in., $5.50, all per net ton at ovens.

MONTHLY AVERAGE PRICES OF METALS

Silver	New York			London		
	1916	1917	1918	1916	1917	1918
Jan.	56.775	75.630	88.702	26.960	36.682	44.356
Feb.	56.755	77.585	85.716	26.975	37.742	42.792
Mar.	57.935	73.861	88.082	27.597	36.410	43.620
April	84.415	73.875	95.346	30.662	36.963	47.215
May	74.269	74.745	99.505	35.477	37.940	48.980
June	65.024	76.971	99.500	31.060	39.065	48.875
July	62.940	79.010	99.625	30.000	40.110	48.813
Aug.	66.083	85.407	100.292	31.498	43.418	49.077
Sept	68.515	100.740	101.125	32.584	50.920	49.500
Oct.	67.855	87.332	.....	32.361	44.324	.....
Nov.	71.604	85.891	.....	34.192	43.584	.....
Dec.	75.765	85.960	.....	36.410	43.052	.....
Year	65.661	81.417	.....	31.315	40.851	.....

New York quotations cents per ounce troy, fine silver; London, pence per ounce, sterling silver, 0.925 fine.

Copper	New York		London			
	Electrolytic		Standard		Electrolytic	
	1917	1918	1917	1918	1917	1918
Jan.	28.673	23.500	131.921	110.000	142.895	125.000
Feb.	31.750	23.500	137.895	110.000	148.100	125.000
Mar.	31.481	23.500	136.750	110.000	151.000	125.000
April	27.935	23.500	133.842	110.000	147.158	125.000
May	28.788	23.500	130.000	110.000	142.000	125.000
June	29.962	23.500	130.000	110.000	142.000	125.000
July	26.620	25.904	128.409	119.913	140.409	134.913
Aug.	25.380	26.000	122.391	122.000	137.000	137.000
Sept.	25.073	26.000	117.500	122.000	135.250	137.000
Oct.	23.500	.....	110.000	.....	125.000	.....
Nov.	23.500	.....	110.000	.....	125.000	.....
Dec.	23.500	.....	110.000	.....	125.000	.....
Year	27.180	.....	124.892	.....	138.401	.....

Tin	New York		London	
	1917	1918	1917	1918
January	44.175	85.500	185.813	293.227
February	51.420	92.000	198.974	311.525
March	54.388	(a)	207.443	318.875
April	55.910	(a)	220.171	329.905
May	63.173	(a)	245.114	364.217
June	62.053	(a)	242.083	331.925
July	62.570	(a)	242.181	360.347
August	62.681	(a)	243.978	380.900
September	61.542	(a)	244.038	343.905
October	61.851	.....	247.467	.....
November	74.740	.....	274.943	.....
December	87.120	.....	298.556	.....
Av. year	61.802	.....	237.563	.....

(a) No average computed.

Lead	New York		St. Louis		London	
	1917	1918	1917	1918	1917	1918
January	7.626	6.782	7.530	6.684	30.500	29.50
February	8.636	6.973	8.595	6.899	30.500	29.50
March	9.199	7.201	9.120	7.091	30.500	29.50
April	9.288	6.772	9.158	6.701	30.500	29.50
May	10.207	6.818	10.202	6.704	30.500	29.50
June	11.171	7.611	11.123	7.511	30.500	29.50
July	10.710	8.033	10.644	7.750	30.500	29.50
August	10.594	8.050	10.518	7.750	30.500	29.50
September	8.680	8.050	8.611	7.750	30.500	29.50
October	6.710	.....	6.650	.....	30.500	.....
November	6.249	.....	6.187	.....	30.500	.....
December	6.375	.....	6.312	.....	30.500	.....
Year	8.787	.....	8.721	.....	30.500	.....

Spelter	New York		St. Louis		London	
	1917	1918	19 7	1918	1917	1918
January	9.619	7.836	9.449	7.661	48.329	54.000
February	10.045	7.814	9.875	7.639	47.000	54.000
March	10.300	7.461	10.130	7.286	47.000	54.000
April	9.459	6.890	9.289	6.715	54.632	54.000
May	9.362	7.314	9.192	7.114	54.000	54.000
June	9.371	8.021	9.201	7.791	54.000	54.000
July	8.643	8.688	8..73	8.338	54.000	54.000
August	8.360	8.985	8.190	8.635	54.000	54.000
September	8.136	9.442	7.966	9.092	54.000	54.000
October	7.983	.....	7.813	.....	54.000	.....
November	7.847	.....	7.672	.....	54.000	.....
December	7.685	.....	7.510	.....	54.000	.....
Year	8.901	.....	8.813	.....	52.413	.....

New York and St. Louis quotations, cents per pound. London, pounds sterling per long ton.

Pig Iron, Pgh.	Bessemer‡		Basic‡		No. 2 Foundry	
	1917	1918	1917	1918	1917	1918
January	$35.95	$37.25	$30.95	$33.95	$30.95	$33.95
February	36.37	37.25	30.95	33.95	30.95	33.95
March	37.37	37.25	33.49	33.95	35.91	33.95
April	42.23	36.15	38.90	32.95	40.06	33.95
May	46.94	36.20	42.84	33.00	43.60	34.00
June	54.22	36.36	50.05	33.16	50.14	34.16
July	57.45	36.60	53.80	33.40	53.95	34.40
August	54.17	36.60	50.37	33.40	53.95	34.40
September	46.40	36.60	42.24	33.40	48.5	34.40
October	37.25	.....	33.95	.....	33.95	.....
November	37.25	.....	33.95	.....	33.95	.....
December	37.25	.....	33.95	.....	33.95	.....
Year	$43.57	.....	$39.62	.....	$40.83	.....

‡ As reported by W. P. Snyder & Co.

STOCK QUOTATIONS

N. Y. EXCH.†	Oct. 15
Alaska Gold M.	3⅛
Alaska Juneau	1½
Am.Sm.&Ref.,com.	82⅛
Am. Sm. & Ref., pf.	104
Am. Sm. Sec., pf., A	89
Am. Zinc	14⅛
Am. Zinc, pf.	46⅛
Anaconda	71⅛
Batopilas Min.	1
Bethlehem Steel	73⅛
Butte & Superior	24⅛
Butte Cop. & Zinc	9⅛
Cerro de Pasco	35⅛
Chile Cop	21
Chino	39⅛
Colo.Fuel & Iron	42⅛
Crucible Steel	56
Crucible Steel, pf.	89
Dome Mines	10⅛
Federal M. & S.	10⅛
Federal M. & S., pf.	38⅛
Great Nor., ore ctf.	31⅛
Greene Cananea	51⅛
Gulf States Steel	71
Homestake	80
Inspiration Con.	54⅛
International Nickel	30⅛
Kennecott	35⅛
Lackawanna Steel	74⅛
Mexican Petrol.	144⅛
Miami Copper	27⅛
Nat'l Lead, com.	58
National Lead, pf.	103
Nev. Consol.	20⅛
Ontario Min.	7⅛
Ray Con	24
Republic I.&S., com.	88⅛
Republic I. & S., pf.	99⅛
Sloss-Sheffield	55
Tennessee C. & C.	16⅛
U. S. Steel, com.	108⅛
U. S. Steel, pf.	110⅛
Utah Copper	83⅛
Va. Iron C. & C.	70

BOSTON CURB*	Oct. 15
Alaska Mines Corp.	‡.12
Boston Ely	.95
Boston & Mont.	.44
Butte & Lon'n Dev.	.13
Calaveras	.50
Chief Con.	3⅛
Contact	‡.15
Corbin	.25
Cortes	.12
Crown Reserve	.18
Crystal Cop.	.47
Eagle & Blue Bell	2⅛
First Nat. Cop.	1⅛
Houghton Copper	.40
Intermountain	‡.05
Iron Cap	18⅛
Mexican Metals	.30
Mines of America	.90
Mojave Tungsten	.09
Nat. Zinc & Lead	.09
Nevada-Douglas	.38
New Baltic	.60
New Cornelia	17⅛
Oneco	.15
Pacific Mines	‡.35
Rex Cons.	.06
Yukon Gold	.80

SAN FRAN.*	Oct. 15
Alta	.03
Andes	.02
Best & Belcher	.01
Caledonia	.01
Challenge Con.	.03
Confidence	.08
Con. Virginia	.08
Gould & Curry	.01
Hale & Norcross	.01
Jacket-Cr. Pt.	.05
Mexican	.06
Occidental	.40
Ophir	.09
Overman	.01
Savage	‡.02
Sierra Nevada	.06
Union Con.	.14
Utah Con.	‡.01
Belmont	2.30
Jim Butler	.48
MacNamara	.19
Midway	.07
Mont.-Tonopah	.09
North Star	.03
Rescue Eula	.08
West End Con.	.96
Atlanta	.02
Booth	.03
Comb. Frac.	‡.02
Florence	.09
Jumbo Extension	.09
Kewanas	.02
Nevada Hills	.02
Nevada Packard	.13
Round Mountain	.16
Silver Pick	.02
White Caps	.09
Big Jim	‡.75
United Eastern	3.25

COLO. SPRINGS*	Oct. 15
Cresson Con.	4.62½
Doctor Jack Pot.	.03½
Elkton Con.	.05
El Paso	.10
Gold Sovereign	‡.02
Golden Cycle	‡.67
Granite	.18
Isabella	.04½
Mary McKinney	.07½
Portland	.85
United Gold M.	.10
Vindicator	.37

BOSTON EXCH.*	Oct. 15
Adventure	‡.60
Ahmeek	78
Algomah	‡.15
Allouez	‡49
Ariz. Com., ctfs.	15½
Arnold	‡.20
Bingham Mines	‡19½
Bonanza	‡.16
Butte-Balaklava	‡.25
Calumet & Ariz.	‡67
Calumet & Hecla	456
Centennial	‡11⅛
Copper Range	47⅛
Daly West	‡2⅛
Davis-Daly	5⅛
East Butte	10⅛
Franklin	‡4
Granby	‡79
Hancock	6
Hedley	‡12
Helvetia	‡.20
Indiana	‡.60
Isle Royale	26
Keweenaw	‡.70
Lake	5⅛
La Salle	‡3
Mason Valley	‡3⅛
Mass	‡4⅛
Mayflower	‡2
Michigan	‡2⅛
Mohawk	54
New Arcadian	1⅛
New Idria	‡13
North Butte	‡13⅛
North Lake	‡.40
Ojibway	‡.75
Old Dominion	41⅛
Osceola	‡55⅛
Quincy	66
St. Mary's M. L.	48
Santa Fe	‡.60
Seneca	13⅛
Shannon	4
Shattuck-Ariz.	‡14
So. Lake	‡1
So. Utah	‡.12
Superior	‡4⅛
Superior & Bost.	3⅛
Trinity	3
Tuolumne	.95
U. S. Smelting	43⅛
U. S. Smelt'g, pf.	43⅛
Utah Apex	‡1⅞
Utah Con.	9⅛
Utah Metal	2
Victoria	2⅛
Winona	‡1
Wolverine	22⅛
Wyandot	‡.50

N. Y. CURB†	Oct. 15
Big Ledge	⅛
Butte & N. Y	‡.75
Butte Detroit	.06
Caledonia	.49
Calumet & Jerome	⅛
Can. Cop. Corpn.	1¼
Carlisle	‡2
Cashboy	‡.03
Con. Ariz. Sm.	1⅛
Con. Coppermines	5⅛
Emma Con.	‡.03⅛
Goldfield Con.	.21
Goldfield Merger	‡.01⅛
Greenmonster	‡⅛
Hecla Min.	5⅛
Howe Sound	‡4
Jerome Verde	‡⅛
Louisiana	‡⅛
Magma	‡32
Majestic	.19
Marsh	.03
McKinley-Dar-Sa.	‡.41
Milford	‡.75
Mother Lode	.34
Nixon Nevada	.33
Ohio Cop.	⅛
Rawley	‡2⅛
Ray Hercules	4
Richmond	‡.56
Rochester Mines	.35
St. Joseph Lead	14
Standard S. L.	.25
Stewart	.14
Success	‡.12
Tonopah	‡2⅛
Tonopah Ex.	1⅛
Tribullion	⅛
Troy Arizona	‡.09
United Verde Ext.	37
United Zinc	‡1⅛
Utica Mines	‡.08

TORONTO*	Oct. 15
Adanac	.09
Bailey	.03
Beaver Con.	.27
Chambers Ferland	.08
Coniagas	2.00
Hargraves	.02
Kerr Lake	5.87½
La Rose	.48
Min. Corp. of Can.	2.00
Nipissing	8.37½
Peterson Lake	.07
Temiskaming	.28
Wettlaufer-Lor.	.03
Davidson	.25
Dome Exten.	.17
Dome Lake	.10
Hollinger	4.87½
McIntyre	1.37½
Newray	.09
Porcu. Crown	.13
Teck-Hughes	.20
Vipond	.14
West Dome	.08

* Bid prices. †Closing prices. ‡ Last quotations.